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Articles is this issue represent the substantive content of a series of 25 workshops sponsored by the American Association of Colleges for Teacher Education (AACTE). The four major articles discuss innovative models based on four approaches for improving teacher performance: (1) "Interaction Analysis" by Edmund J. Amidon, San Francisco State College; (2) "Nonverbal Communication" by Charles M. Galloway, The Ohio State University; (3) "Microteaching" by Dwight W. Allen and Arthur S. Eve, University of Massachusetts; and (4) "Simulation" by Donald R. Cruickshank, The University of Tennessee. With the description of each model are the concepts, vocabulary, data, and the instrumental acts necessary for understanding. Each model is followed by an article written by teacher educators who have used the model in an educational setting: Douglas L. Minnis and Kenneth Shrable, University of California; Sue S. Lail University of Kentucky; David B. Young, University of Maryland; Dorothy A. Young, Johns Hopkins University; Glennon Rowell, Florida State University. The final article by Asahel D. Woodruff, University of Utah, presents "The Rationale" on which the AACTE workshops were focused--a model of learning which allowed for participant involvement and freedom and provided a context to present the utilization of media and new technology. (JS)

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THEORY
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College of Education
The Ohio State University

tip

A Workshop in the Analysis of Teaching

Interaction Analysis

Nonverbal Communication

Microteaching

Simulation

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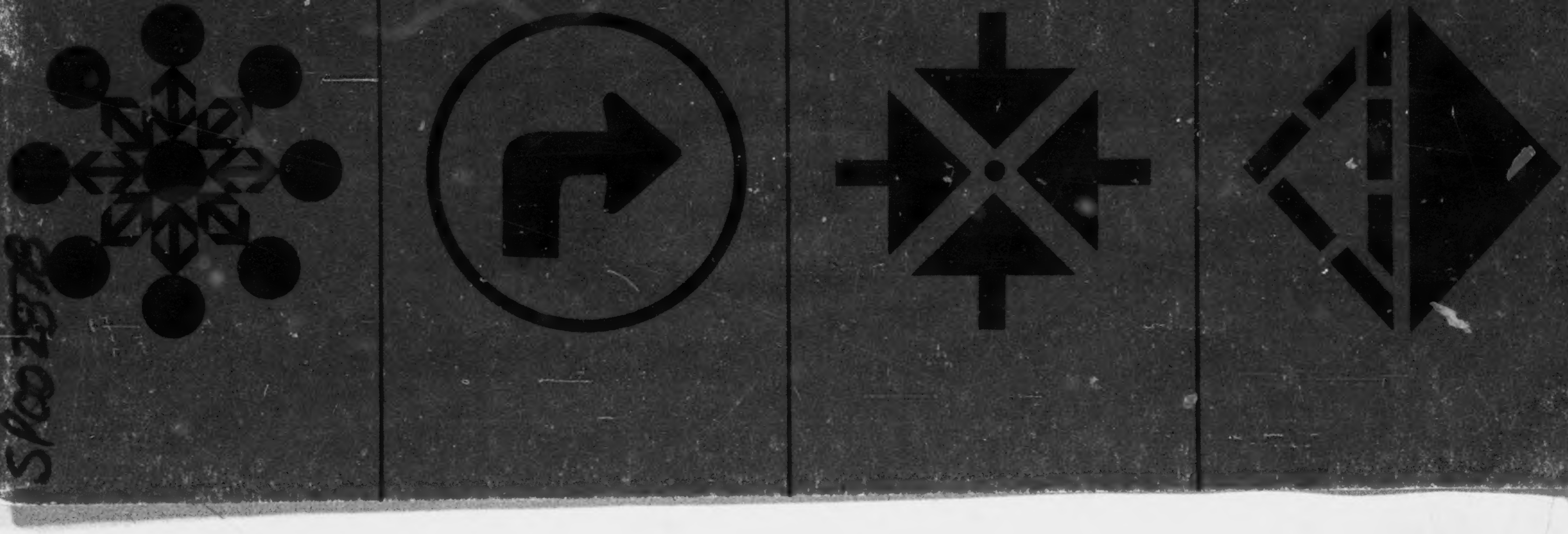

SP002978

157 **This Issue**
Walter J. Mars

159 **Interaction Analysis**
Edmund J. Amidon

168 **The Model in Use**
Douglas L. Minnis and Kenneth Shrable

172 **Nonverbal Communication**
Charles M. Galloway

176 **The Model in Use**
Sue S. Lail

181 **Microteaching**
Dwight W. Allen and Arthur S. Eve

186 **The Model in Use**
David B. Young and Dorothy A. Young

190 **Simulation**
Donald R. Cruickshank

194 **The Model in Use**
Glennon Rowell

197 **The Rationale**
Asahel D. Woodruff

203 **Index to Volume VII**

JACK R. FRYMIER, editor
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talk, gesture, skills, realities . . .

This Issue

We no longer suffer in education from a lack of creative and innovative approaches to our problems in teacher education.

We can see in the work of such research and development centers as the University of Pittsburgh the development of programs which individualize instruction for every elementary school child. In Georgia, thousands of teachers are being upgraded through the use of television in a statewide inservice education program of the University of Georgia.

Many schools like the University of Connecticut, Fordham University, and Temple University have researched and experimented with new methods for teaching disadvantaged youth and new programs for preparing teachers to work successfully with children in the inner city.

These programs and many others like them are dependent upon the active involvement of teachers. Without it, new programs and new approaches to old problems stand little chance of success.

At the heart of any innovative effort is the preparation of preservice teachers and the retraining of those already in professional service. Numerous examples of new and innovative approaches to the preservice and inservice education of teachers can be identified that underscore the realization of the teacher's critical role. In many inservice and preservice efforts for teacher improvement, educators are implementing techniques of both verbal and nonverbal observation and analysis, as well as systems of controlled practice aimed at specific aspects of teaching or focused on the needs of pupils and environmental and social factors.

In the following pages in articles by Edmund J. Amidon, Charles M. Galloway, Dwight W. Allen, and Donald R. Cruickshank, four innovative models based upon these approaches for improving teacher performance are discussed—microteaching, interaction analysis, nonverbal communication, and simulation. With the description of each model are the concepts, vocabulary, data, and the instrumental acts necessary for understanding. Each model is followed by an article written by a teacher educator who has actually used the model in an educational setting.

These four particular approaches were presented together in recent months in a series of twenty-five workshops to more than a thousand teacher educators throughout the country under the sponsorship of the American Association of Colleges for Teacher Education.

In such attempts to disseminate the results of research in educational conferences, meetings, conventions, workshops, and seminars (and for that matter, in the classroom), we too often ignore or do real violence to what we know about how learning takes place. We tend to talk about our material and talk at our intended audience—the effect has been to provide considerable information *about* but really little knowledge *of* a subject. The result has been a lack of sufficient understanding to make intelligent decisions concerning implementation.

A dissemination project that has participant learning as a major goal requires conditions that make behavioral development possible to avoid such pitfalls. Thus, the AACTE workshop was designed to allow real or simulated demonstration in a manner consistent with an accepted approach to learning. The Woodruff cybernetic cycle of behavior model was adopted as the rationale. This theory which served as the working model for the workshop is largely that discussed in the final article by Asahel D. Woodruff.

In the following pages, THEORY INTO PRACTICE presents the substantive content of this workshop. However, since the workshop involved a maximum amount of interaction between presentors and participants, our attempt in this issue is like constructing a three dimensional figure on a two dimensional plane. Much is left to your interpretation. The missing dimension is your involvement. This is vital, for in the final analysis, the responsibility for whether any progress is made at all through such efforts as the workshop or such innovations as interaction analysis, nonverbal communication, microteaching, or simulation remains with an individual teacher, supervisor, or teacher educator—with you. If you believe that to help students and teachers better understand the what and why of teaching behavior is a critical and essential activity in teacher improvement, these pages can help.

The innovative components which are discussed are systems and techniques that focus on the realities of the teaching situation and that provide workable approaches to teacher improvement. They are based on what all teachers have in common—for all teachers, regardless of level or subject, talk, gesture, need certain skills, and need to be sensitive to the realities of the classroom.

Walter J. Mars, *Guest Editor*
Associate Secretary
American Association of
Colleges for Teacher Education

talk . . .

To help students and teachers to be more self-analytical and more precise in stating their instructional objectives many teacher training programs and inservice efforts are using techniques such as interaction analysis. Such a system allows the individual teacher to understand more clearly the degrees and kinds of influences he exercises in the classroom through the activity in which he is most often engaged—talking.

Interaction Analysis

Edmund J. Amidon
Visiting Professor
San Francisco State College

Interaction Analysis is a system for describing and analyzing teacher-pupil verbal interaction. Although this particular approach has been used for classroom research for nearly twenty years, its use has become widespread only during the last four years. It has found its way into many different kinds of educational programs—both research and developmental. Basically, Interaction Analysis has been used to help quantify teacher verbal behavior. The system can also be used to study the relationship between teaching style and pupil achievement.

A recent application of Interaction Analysis has been in teacher education. It has proven useful in educational psychology and education courses as a tool for analyzing teacher behavior. Research on teacher-pupil interaction patterns has also provided the basis for education or educational psychology courses concerned with the teacher's role and behavior in the classroom. It is also a valuable tool in courses concerned with observation skills. The greatest use of Interaction Analysis has probably been in student teaching or teaching internships. In such activities, the tool is used for several basic purposes: (1) developing skill in observation of teaching; (2) providing a tool for the analysis of teaching; (3) providing a tool for feedback about one's teaching; (4) setting a framework for practicing and learning specific teaching skills; and (5) providing a framework for conceptualizing and developing various teaching styles. Inservice teacher education projects employing Interaction Analysis are also geared toward these objectives.

Projects testing Interaction Analysis in teacher education have demonstrated that the use of Interaction Analysis as a teacher training tool results in specific changes in teacher behavior—teachers have usually become more accepting and less critical. Their classes are also characterized by a greater number of student initiated comments.

In Interaction Analysis observation, all teacher statements are classified as either indirect or direct. This classification gives central attention to the amount of freedom granted the student by the teacher. Therefore, in a given situation, a teacher has a choice. He can be direct, minimizing the freedom of the student to respond, or he can be indirect, maximizing such freedom. His choice, conscious or unconscious, depends upon many factors, among which are his perceptions of the classroom interaction and the goals of the particular learning situation.

To make total classroom behavior or interaction meaningful, Interaction Analysis also provides for the categorizing of student talk. A third major section, that of silence or confusion, is included to account for the time spent

Editor's Note: Dr. Amidon is Professor of Educational Psychology and Psychology at Temple University. He is on leave for the current academic year.

Summary of Categories for Interaction Analysis

TEACHER TALK	INDIRECT INFLUENCE	1. *ACCEPTS FEELING:* accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings is included.
		2. *PRAISES OR ENCOURAGES:* praises or encourages student action or behavior. Jokes that release tension, but not at the expense of another individual; nodding head, or saying "um hm?" or "go on" are included.
		3. *ACCEPTS OR USES IDEAS OF STUDENTS:* clarifies, builds, or develops ideas suggested by a student. As teacher brings more of his own ideas into play, shift to Category 5.
	DIRECT INFLUENCE	4. *ASKS QUESTIONS:* asks a question about content or procedure with the intent that a student answer.
		5. *LECTURING:* gives facts or opinions about content or procedures; expresses his own ideas; asks rhetorical questions.
		6. *GIVING DIRECTIONS:* directions, commands, or orders with which a student is expected to comply.
		7. *CRITICIZING OR JUSTIFYING AUTHORITY:* statements intended to change student behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
	STUDENT TALK	8. *STUDENT TALK — RESPONSE:* talk by students in response to teacher. Teacher initiates the contact or solicits student statement.
		9. *STUDENT TALK—INITIATION:* talk by students, which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10. *SILENCE OR CONFUSION:* pauses, short periods of silence, and periods of confusion in which communication cannot be understood by observer.

in behavior other than that which can be classified as either teacher or student talk.

All statements in the classroom, then, are categorized into one of three major sections: (1) teacher talk, (2) student talk, and (3) silence, confusion, or anything other than teacher or student talk.

The larger sections of teacher and student verbal behavior are subdivided to make the total pattern of teacher-pupil interaction more meaningful. The two subdivisions for teacher verbal behavior, indirect and direct teacher talk, are further divided into categories: (1) accepting feeling, (2) praising or encouraging, (3) accepting ideas, and (4) asking questions. Direct influence is divided into three categories: (5) lecturing, (6) giving directions, and (7) criticizing or justifying authority. Student talk is divided into only two categories: (8) responding to teacher, and (9) initiating talk. All are mutually exclusive; yet together, are totally inclusive of all verbal interaction occurring in the classroom. A description of these categories is described in the summary on this page.

There is no scale implied by the numbers. Each number is classificatory; it designates a particular kind of communication event. To write these numbers down during observation is to enumerate—not to judge a position on a scale.

Interaction Analysis, originally used as a research tool, is employed by a trained observer to collect reliable data regarding classroom behavior as a part of a research project.

The system is especially meaningful as an inservice training device for teachers. It may be employed by a teacher either as he observes someone else teach or as he categorizes a tape recording of his own classroom behavior. In either case, the method is the same.

Every three seconds the observer writes down the category number of the interaction he has just observed. He records these numbers in sequence in a column, usually about twenty numbers per minute; thus, at the end of a period of time, he will have several long columns of numbers. It is important to keep the tempo as steady as possible, but even more crucial is to be accurate. The observer may also make marginal notes from time to time to explain classroom happenings as analysis is developed.

The observer stops classifying whenever classroom activity is changed so that observing is inappropriate, when, for example, there are various groups working around the classroom or when children are working in workbooks or doing silent reading. He usually draws a line under the recorded numbers, makes a note of the new activity, and resumes categorizing when the total class discussion continues. The observer always identifies the kind of class activity he is observing—the reading group in the elementary school is obviously different from an informal discussion period, a review of subject matter, a period of supervised seat work, teacher-directed discussion, introduction of new material, or evaluation of a completed unit. Such diverse activities may be expected to show different types of teacher-pupil interaction, even when guided by the same teacher. A shift to new activity should also be noted.

A thorough knowledge of the categories and much practice to achieve accuracy are basic to the use of this technique for analyzing teacher-pupil interaction.

There is a method of recording the sequence of classroom events so that certain facts become readily apparent. This consists of entering the sequence of numbers into a 10-row by 10-column table, called a matrix (see Table 1). The generalized sequence of the teacher-pupil interaction can be examined readily in this matrix. How an observer would classify and record in the matrix what occurs in a classroom is illustrated in the following example.

A fifth-grade teacher is beginning a social studies lesson. The observer has been sitting in the classroom for several minutes and has begun to get some idea of the general climate. The teacher begins, "Boys and girls, please open your social studies books to page 5." (Observer classifies this as a 6, followed by a 10 because of the period of silence and confusion as the children try to find the page.)

Then, the teacher says, "Jimmy, we are waiting for you. Will you please turn your book to page 5?" (Observer records a 7 and a 6.)

"I know now," continues the teacher, "that some of us had a little difficulty with, and were a little disturbed by, the study of this chapter yesterday; I think that today we are going to find it more exciting and interesting." (Observer records two 1's, reacting to feeling.)

"Now, has anyone had a chance to think about what we discussed yesterday?" (Observer records a 4 for a question.)

A student answers, "I thought about it, and it seems to me that the reason we are in so much trouble in Southeast Asia is that we really haven't had a chance to understand the ways of the people who live there." (Observer records three 9's.)

The teacher responds by saying, "Good, I am glad that you suggested that, John. Now let me see if I understand your idea completely. You have suggested that if we had known the people better in Southeast Asia, we might not be in the trouble we are in today." (This is classified as a 2, followed by two 3's.)

The observer has now classified the following sequence of numbers in this fashion (the use of a 10 at the beginning and end of the sequence is explained in the discussion that follows):

10
) 1st pair
6
2nd pair (
10
) 3rd pair
7
4th pair (
6
)
1
(
1
)
4
(
9
)
9
(
9
)
2
(
3
)
3
(
10

Tabulations are now made in the matrix to represent pairs of numbers. Notice in the above listing that the numbers have been marked off in pairs—the first pair is 10-6; the second is 6-10, etc. The particular cell in which tabulation of the pair of numbers is made is determined by using the first number in the pair to indicate the row and second number in the pair for the column. Thus, 10-6 would be shown by a tally in the cell formed by row 10 and column 6. The second pair, 6-10, would be shown in the cell formed by row 6 and column 10. The third pair, 10-7, is entered into the cell, row 10 and column 7. Each pair of numbers overlaps with the previous pair, and each number, except the first and the last, is used twice. This is the reason that a 10 is entered as the first number and the last number in the record. This number is chosen because it is convenient to assume that each record began and ended with silence. This procedure also permits the total of each column to equal the total of the corresponding row.

Checking the tabulations in the matrix for accuracy is easily done by noting that there should be one less tally in the matrix than there are numbers entered in the original observation record (N-1). In this example, there are 15 numbers and the total number of tallies in the matrix is 14. This tabulation is shown in Table 1.

TABLE 1

Sample Interaction Matrix

Second

		1	2	3	4	5	6	7	8	9	10	
	1	1			1							
	2			1								
	3			1							1	
	4									1		
First	5											
	6	1									1	
	7						1					
	8											
	9		1							2		
	10						1	1				Matrix Total
	Total	2	1	2	1	0	2	1	0	3	2	14
	%											

Ordinarily a separate matrix is made for each specific lesson or major activity. If the observer is categorizing forty minutes of arithmetic and twenty minutes of social studies, he makes one matrix for the arithmetic and another for the social studies. If a secondary teacher has a thirty-minute discussion period, followed by a twenty-minute period of more structured lecture in another area, then the observer usually makes two separate matrices. Matrices are more meaningful when they represent a single type of activity or work.

After the observer tabulates a matrix, he then has to describe the classroom interaction. There are several ways of doing this, but he begins by reporting the different kinds of statements in terms of percentages. The first step is computing the percentage of tallies in each column to determine the proportion of the total interaction in the observed classroom situation found in each category. This is done by dividing each of the column totals, 1 through 10, by the total number of tallies in the matrix. A similar procedure is used to determine the percentage of total teacher talk in each category. This is done by dividing the total of each category, 1 through 7, by the sum of these seven categories. For example in Table 2 the teacher had 105 tallies in columns 1-7. If 10 of these tallies are in column 3, then 10 is divided by 105, and the amount of teacher talk that falls into category 3 is approximately 9½ per cent of the total amount of teacher talk. The pattern of interaction that the teacher has used with the class is now evident.

The total percentage of teacher talk that is of prime importance in interpreting the matrix is found by dividing the total number of tallies in columns 1 through 7 by the total number of tallies in the matrix. There are 150 tallies in a matrix, 105 of which are in columns 1-7 (Table 2). This teacher talked 70 per cent of the total observation time.

To find the percentage of student talk, the total number of tallies in columns 8 and 9 is divided by the total number of tallies in the matrix. Assuming that columns 8 and 9 contained 42 tallies, the students talked 28 per cent of the time. A total of three tallies in column 10, when divided by 150, shows that 2 per cent of the time was spent in silence or confusion.

Next the observer focuses on the relative number of indirect and direct teacher statements. The total number of tallies in columns 1, 2, 3, and 4 is divided by the total number of tallies in columns 5, 6, and 7, plus the total in columns 1, 2, 3, and 4, to find the I/D ratio or the ratio

TABLE 2

A Typical Illustration

Second

		1	2	3	4	5	6	7	8	9	10	
	1	1				1				1		
	2		4	1					2			
	3		1	6	1				2			
	4			1	14				5			
First	5	1				48			6			
	6						1		4			
	7							4		1		
	8		2	2	5	6	4		11			
	9	1						1		9	1	
	10									1	2	Matrix Total
	Total	3	7	10	20	55	5	5	30	12	3	150
	%	2	4½	6½	13½	36½	3½	3½	20	8	2	

TEACHER TALK	**STUDENT TALK**
Columns 1-7 = 105	Columns 8-9 = 42
105 ÷ 150 = 70%	42 ÷ 150 = 28%

Indirect (1-4) ÷ Direct (1-4) plus (5-7) = I/D Ratio

$$40 \div 40 \text{ plus } 65 = \frac{40}{105} = .38$$

Indirect (1-3) ÷ Direct (1-3) plus (6-7) = Revised I/D Ratio

$$20 \div 20 \text{ plus } 10 = \frac{20}{30} = .67$$

of indirect to direct teacher statements. An I/D ratio of .5 means that for every indirect statement there was one direct statement; an I/D ratio of .67 means that for every two indirect statements there was only one direct statement, etc.

A revised I/D ratio is used to find the kind of emphasis given to motivation and control in a particular classroom. The number of tallies in columns 1, 2, and 3 is divided by the number of tallies in columns 1, 2, 3, plus those in 6 and 7, to find this revised ratio. Categories 1, 2, 3, 6, and 7 are more concerned with motivation and control in the classroom and less concerned with the actual presentation of subject matter. This ratio eliminates the effects of categories 4 and 5, lecture and asking questions, and gives information about whether the teacher is direct or indirect in his approach.

The matrix is a convenient device for analyzing the summarized teacher-pupil interaction data. By studying the matrix, the observer will be able to identify those cells in which he has heavy buildups of tallies, as well as those in which there are no tallies.

TABLE 3

Matrix A

Content Cross

	1	2	3	4	5	6	7	8	9	10	T
1				▨	▨						
2				▨	▨						
3				▨	▨						
4	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
5	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
6				▨	▨						
7				▨	▨						
8				▨	▨						
9				▨	▨						
10				▨	▨						
T				▨	▨						

Matrix A, Table 3, illustrates two of the most common teacher verbal behaviors. This lesson is based on content and the teacher is engaged in both presenting and soliciting information. The steady state cells (5-5, 4-4) reveal that both the lecture and questions are at times extended. An examination of each of the transition cells in rows and columns 4 and 5 indicates the verbal behaviors that precede and follow each instance of lecture or questions. The type of student talk (narrow vs. broad; factual vs. divergent) may reveal something about the cognitive level of the questions asked by the teacher (4-8, 4-9). Questions may include or follow the presentation of information (4-5, 5-4).

Following are some of the questions answered by analysis of this section of the matrix:

1. What types of questions (examine the 4-8 and 4-9 cells) does the teacher ask?
2. Are the questions long or short (examine the 4-4 cell)?
3. What verbal behaviors follow the questions (examine row 4)?
4. Is the lecture long or short (examine the 5-5 cell)?
5. Is the lecture interspersed with student initiated talk (examine the 5-9 cell)?
6. Is the lecture followed by teacher questions (examine 5-4 cell)?

Table 4, Matrix B, shows cells referred to as the "steady state cells." Only when the behavior remains in a single category for six seconds or longer will there be tallies in these cells. If, for example, there is a tally in the 4-4 cell it means that a question was fairly long (at least 6 seconds). These 10 cells are the only cells that identify continuous talk in a category; all others are transitional, representing movement from one category to another.

A comparison of these 10 diagonal cells with the transition cells gives an idea about the *pace* of interaction in the classroom. Heavy loading in the diagonal cells indicates slower pace—heavy loading in the transition cells indicates a quick pace.

TABLE 4

Matrix B

Steady State Cells

	1	2	3	4	5	6	7	8	9	10	T
1	▨										
2		▨									
3			▨								
4				▨							
5					▨						
6						▨					
7							▨				
8								▨			
9									▨		
10										▨	
T											

Matrix C illustrates the teacher verbal behaviors preceding the pupil verbal behaviors. Analysis of the fourteen cells in columns 8 and 9, rows 1 through 7, indicates those teacher statements likely to produce student talk and whether this student talk is responsive or initiatory. Since student talk invariably follows questions or directions, heavy loadings in other than 4-8, 4-9, 6-8, and 6-9 cells may indicate atypical classroom interaction patterns. For example, a large number of tallies in the 5-9 cell might indicate that the teacher's lecture was interspersed with students' questions or comments. Heavy concentration in the 5-9 and 7-9 cells might indicate student resistance to the lecture or the teacher's control. On the other hand, tallies in the 2-9 and 3-9 cells might indicate a discussion in which the students willingly participated or offered their own ideas.

Matrix D illustrates the various teacher verbal behaviors following the various pupil verbal behaviors. Analysis of the cells in rows 8 and 9, columns 1 through 7, indicates those teacher statements which follow student talk. A comparison of cells 8-1, 8-2, 8-3, 8-4, 9-1, 9-2, 9-3, 9-4 with 8-5, 8-6, 8-7, 9-5, 9-6, 9-7 determines whether a teacher is indirect or direct in his reactions to student talk. Comparison between rows 8 and 9 reveals whether a teacher reacts differently to responsive than to initiatory student talk.

Matrix E represents the teacher's emphasis on using student ideas, extending and amplifying student statements, accepting and enlarging upon student feelings, and giving long statements of praise. It also includes transition from one of the three categories to another. A high frequency in cells indicated in Table 7 shows the extent that the teacher extends (in time) indirect influence.

Table 8 indicates the teacher's emphasis on criticism and giving lengthy direction or moving from one to the other. In general, tabulations in this area suggest extended direct influence by the teacher and a heavy focus on the use of authority. One pattern often observed shows a teacher giving a direction that is not followed. Criticism ensues, and the teacher repeats the direction or gives a new direction. If it is not followed, the teacher again criticizes. Behavior shown in the pattern 6-6, 6-7, 7-6, 7-7 often indicates discipline problems or student rejection of teacher influence. High frequencies in the 6-6 cell alone do not necessarily reflect on discipline.

TABLE 5

Matrix C

Student Talk Following Teacher Talk

	1	2	3	4	5	6	7	8	9	10	T
1								▨	▨		
2								▨	▨		
3								▨	▨		
4								▨	▨		
5								▨	▨		
6								▨	▨		
7								▨	▨		
8											
9											
10											
T											

TABLE 6

Matrix D

Teacher Reaction to Student Talk

	1	2	3	4	5	6	7	8	9	10	T
1											
2											
3											
4											
5											
6											
7											
8	▨	▨	▨	▨	▨	▨	▨				
9	▨	▨	▨	▨	▨	▨	▨				
10											
T											

TABLE 7

Matrix E

Extended Indirect Influence

	1	2	3	4	5	6	7	8	9	10	T
1	▨	▨	▨								
2	▨	▨	▨								
3	▨	▨	▨								
4											
5											
6											
7											
8											
9											
10											
T											

TABLE 8

Matrix F

Extended Direct Influence

	1	2	3	4	5	6	7	8	9	10	T
1											
2											
3											
4											
5											
6							▨	▨			
7							▨	▨			
8											
9											
10											
T											

The interaction matrix can be used most effectively as a diagnostic and planning device. The teacher, student teacher, or teaching intern first learns to recognize and code examples of the behavioral categories in classroom verbal interaction. He then learns to construct and to interpret an interaction matrix.

The next step consists of planning his own behavioral strategy for a particular lesson. This is done by taking a blank matrix and sketching in the cells those behaviors he intends to utilize. After teaching the lesson, the supervisor and teacher, using the matrix as a focus, analyze the lesson. It is important to tape record the lesson so that various segments can be rechecked. The following indicates the important steps in this supervisory process.

Statement of Objectives. The supervisor asks the teacher to state those teaching behaviors he intends to use in his lesson (in terms of an Interaction Analysis matrix). This "statement of objectives" identifies the behaviors in terms of category codes and corresponds to the matrix established by the teacher as his teaching strategy. However, the actual interaction matrix may vary from the proposed strategy if the teacher decides it is necessary to modify this plan once teaching has begun.

Data Collection. The second step is to collect Interaction Analysis data by coding the teacher-pupil behaviors and tape recording the lesson.

Analysis. The third step consists of comparing the proposed strategy for teaching the lesson with the data collected during the actual instruction. An example might show how this is accomplished.

In Step 1 the teacher has stated his objective to ask broad questions (divergent or evaluative —category 4) so that the students will have a chance to state their opinions, feelings, and ideas (category 9). Reactions will be statements that acknowledge, clarify, and/or summarize these student contributions (category 3). The teacher also intended to allow the students to talk an equal amount of time (ratio of $\frac{1\text{-}7}{8\text{-}9}$). The matrix in Table 9 illustrates this teacher's proposed teaching strategy. It is labeled "ideal," for it represents *his* behavioral ideals or intentions for a particular lesson.

The first step is to identify on the matrix the pattern the teacher has planned: (1) a broad question (divergent or evaluative) followed by student idea, feeling, or opinion (this would indicate the 4-9 cell); (2) student comments would be fairly long, at least 6 seconds (9-9 cell); (3) comments would be followed by acknowledging, clarifying, or summarizing remarks by the teacher (9-3 cell); and (4) the clarifying and summarizing statements would be fairly long, at least six seconds (the 3-3 cell).

TABLE 9

Ideal Matrix

(Proposed Strategy)

	1	2	3	4	5	6	7	8	9	10	T
1											0
2				7							7
3					1						1
4				12	1			13	X	1	27
5				2	12	1		1		1	17
6						3				2	5
7							6	1		3	10
8		7	1	3			2	4		2	19
9			X						X		0
10				3	3	1	2			5	14
T	0	7	1	27	17	5	10	19	0	14	100

Cells indicating the teacher's intended pattern are shown with X's in the matrix.

The next step is to identify the actual interaction pattern produced in the matrix. The teaching pattern analysis procedure for this particular lesson is as follows:

1. Identify (circle) the largest interaction cell in the matrix. This is the first move in the pattern (4-8 cell). An interaction cell is one that is identified at the intersection of two different categories. There are 90 interaction cells. They include all cells in the matrix *except* the ten transition cells 1-1, 2-2, 3-3, 4-4, 5-5, 6-6, 7-7, 8-8, 9-9, and 10-10.

2. Use the second number in move 1, 8, to locate a row and circle the largest interaction cell in that row (8-2). This cell is the second move.

3. Use the second number in the cell identified as move two and locate the corresponding row (2). Circle the largest interaction cell in this row (2-4). This cell is the third move.

4. Follow this procedure and identify the largest interaction cell in the row corresponding to the second number in the cell in the third move. This is cell 4-8 and completes the pattern because 4-8 was the first move in the pattern. Then draw arrows to attach these cells circled in steps 1, 2, 3, and 4. The arrows and circles indicate the lesson teaching pattern. Because the 4-4 cell is (1) as large as the smallest cell in the pattern, and (2) includes a category that occurs in the pattern, it is joined to the pattern with a broken line. This is considered an extension to the pattern; that is, the basic interaction pattern is 4-8-2-4, but the 4's are longer than a single

tally so the actual series of numbers most frequently occurring is 4-4-8-2-4.

The X's in the matrix identify a pattern, including the extension, of 4-9-9-3-3-4. The planned program represented by the X's is different from the pattern taught, so analysis supports the conclusion that the teacher did not achieve his teaching objectives.

Feedback. The feedback step should help the teacher determine why he did not achieve his teaching objectives. The teacher might want to play the audio tape of his lesson or to study the matrix carefully, using the various areas of the matrix (see Tables 3 and 8). After clarifying the specific skills needed to accomplish his teaching objectives, the teacher will practice them.

Practice. The teacher needs to practice both questioning and accepting, clarifying, and summarizing student ideas. At this point, a Skill Development in Teaching model may be used to develop these two skills. As follows, this program employs a microteaching model with the application of Interaction Analysis for stating objectives, collecting data, and giving feedback to the teacher.

Five steps are involved: (1) selecting the appropriate objectives, (2) the skill session, (3) data collection, (4) feedback, (5) practice or reteach.

1. *Stating Objectives.* The teacher selects the specific skill he needs to practice on the basis of the diagnosis just described in the supervisory model. He uses the Expanded Interaction Analysis categories (see Table 10) to operationalize the specific skills he will practice. In the example in this paper, he has two skills to work on: questions and acceptance, acknowledgment, clarifying and summarizing student ideas. Because of the need to get intensive practice with a skill, the teacher would therefore practice one skill at a time; the first would probably use questioning as an example.

2. *Skill Session.* The teacher teaches a microlesson that includes the following specifications:

(1) A simple content objective that can be achieved in about five minutes and that would also be appropriate to asking different types of questions.

(2) Five students to participate in the skill sessions. This number may vary but should be no greater than ten. The students can be children or other teachers playing student roles.

(3) Two each of the four types of questions: F—factual, C—convergent, D—divergent, E—evaluative questions.

(4) If (3) is not accomplished, the microteaching will be repeated.

TABLE 10

The Expanded Interaction Analysis Categories

1. Acceptance of Student Feelings
    a—Acknowledgment—recognizes a student's feeling
    c—Clarification—relates expressed feeling to probable cause
    r—Reference—compares expressed feelings to feelings of others or the teacher
2. Praise of Student Contribution
    W—Without criteria—no reason for praise is given
    P—Public criteria—criteria for praise is given and represents publicly accepted reason
    p—Private criteria—criteria given as teacher's own feelings or value
3. Acceptance of Student Ideas
    a—Acknowledgment—first recognizes the student's idea by mentioning name of student.
    c—Clarification—rephrases or restates idea
    d—Summarization—enumerates or organizes ideas of several students
4. Questions
    f—Factual—asks for fact or specific information
    c—Convergent—asks student to solve problem with specific information
    d—Divergent—asks student to predict or speculate
    e—Evaluative—asks student to express opinion, feeling, or judgment
5. Lecture
    F—Factual—gives facts or information
    M—Motivation—gives enthusiasm or interest to topic
    O—Orientation—gives overview of material
    P—Personal—gives teacher's opinion about subject being discussed
6. Giving Directions
    C—Cognitive—intended to direct student on an intellectual task
    d—Managerial—intended to direct physical activity related to managerial task
7. Criticism
    W—Without criteria—no reason for criticism is given
    P—Public criteria—criteria for the criticism is given and represents a publicly accepted reason
    p—Private criteria—criteria given as teacher's own feelings or value
8. Student Talk Response
    f—Factual—factual answer usually in response to 4F
    c—Convergent—convergent answer usually in response to 4C
9. Student Talk Situation
    d—Divergent—divergent answer usually follows a 4d
    e—Evaluative—evaluative answer usually follows a 4C
    i—Initiation—student makes statement without being asked a question
10. Silence or Confusion
    10—Ten Convention—used to indicate a change in student speaker
    s—Silence—pause of three seconds of silence
    Confusion—periods when no single speaker can be identified

3. *Data Collection.* A basic source of data collection is the supervisor's recording using the Expanded Interaction Analysis categories. In the instance of the skill session on questions, the supervisor would use the basic Interaction Analysis categories 1, 2, 3, 5, 6, 7, and 10, as well as using subdivisions of 4f, c, d, and e and 8f, c, 9d, e, and i. This is because the teaching objectives for the skill session are concerned with questions and how children respond to questions.

In addition to the Interaction Analysis data, other sources of data are available, such as video and audio tape recorders. Usually audio tape recorders are available and can be used to verify Interaction Analysis data. The video tape recorder is particularly important for analysis of nonverbal behavior. It is also useful to collect the reactions of the students to teacher behavior. In the example used here, specific questions would be similar to the following:

1. Did the teacher ask for student opinions?

Yes	Not Sure	No

2. Did the teacher ask questions that gave you a chance to do original thinking?

Yes	Not Sure	No

Another important source of data is the supervisor who should make note of anything that will help in the feedback session following the microteaching.

4. *Feedback.* The focus of the feedback session is on the comparison of the session objective with the data collected during the session. The role of the supervisor is to focus the discussion on the data collected, not to evaluate the teacher's effect except in terms of the objective for the session. The advantages of this kind of feedback session are that the supervisor doesn't need to tell a teacher he has failed. If the data show that the teacher has not met the objectives, the teacher can tell himself he has failed. In many cases, by listening and watching a tape replay, the teacher will gain further insight into teaching.

5. *Practice.* The last step in the program is reteach the lesson, if the teacher is not successful. If, for example, the teacher is unable to ask divergent questions, then the skill session would be concerned only with that type of question.

The program described here seems to have a number of advantages. First, the use of categories makes teaching objectives easily definable. Specific teaching skills are defined as categories that both teachers and supervisors can understand. Second, using categories with operationally agreed upon definitions improves communication by providing a common language for supervisors to use when discussing teaching. Third, the observation of the supervisor is more reliable than in the case of unstructured observation. Fourth, the teacher's observational skill is increased so that he has a new tool for learning; and, fifth, because the supervisor no longer needs to evaluate the teaching session, the relationship between teacher and supervisor should be improved.

Educators often find it difficult to determine what "teaching principles" to emphasize in teacher education. Without a firm empirical research base, this is a serious problem. The assumption underlying this program states that teachers should (1) be able to plan a teaching strategy and carry it out, and (2) have a broad range of teaching skills. Many educators express a point of view consistent with these assumptions; that is, teacher education should help teachers to become more flexible in their use of teaching strategies.

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The Model in Use (Interaction Analysis)

Interaction Analysis has perhaps had its widest application in education so far as a research tool and teacher training device. However, Interaction Analysis is also an effective technique in inservice education to improve the quality of both teacher supervision and classroom teaching.

An illustration of this is a staff development program now in its second year with principals in the Richmond Unified School District, an urban district in Northern California. The first year, in an intensive ten-week training period conducted by a team from the University of California, Davis, the principals learned to use Interaction Analysis as a means to enhance their skills in instructional leadership. They are utilizing this training to set up a staff development program using Interaction Analysis with teachers in their own schools.

The principals participated in activities the first year aimed at learning to use Interaction Analysis with sufficient skill to assist teachers in objectively describing their interaction patterns with students. Outcomes were focused on the creation of an open, nonthreatening environment in principal/staff relationships in which teachers are encouraged to take risks, praised for attempting to learn new behavior patterns, encouraged rather than criticized for experimental failures, supported in their attempts at self-evaluation and self-analysis of classroom behavior, and given the opportunity for privacy in monitoring their interactions with students.

In the course of their training, the principals gained personal insights into the use of Interaction Analysis by self-analysis of interaction with students through a period of full-time teaching. They also worked directly with teachers on efforts to change their supervisory posture from one of criticism of classroom teachers to one of responsiveness to teachers' questions about instruction.

The first two weeks of the project served as an instructional period for the project principals. At the beginning of this phase, they were trained to use Interaction Analysis for classifying and analyzing the verbal behavior of teachers and pupils. Following this instruction, they received training in the classification and analysis of teacher questioning strategies, using a method developed by the authors. The principals also took field trips to observe new developments in teaching both within and outside the district. At the close of this two-week period, they spent some time in reviewing the classification system used in Interaction Analysis and in practicing matrix interpretation under the guidance of the university team.

At the end of the two-week instructional phase, the administrators entered a teaching phase and worked as full-time classroom teachers for four weeks, but in schools other than ones in which they regularly served as principals. Each principal chose the level and subject he wished to teach and assumed the complete responsibilities of the classroom teacher.

Following this experience, principals spent four weeks in a supervisory role, working full time with their staff on improving classroom instruction. Although they returned to their own schools for the supervision phase, an "intern principal" continued to serve as administrator to take care of the usual duties of the principal. The goal of this supervision phase was to lay the groundwork for staff development programs with teachers in their schools.

The principals were trained in groups of ten to twelve, and they were relieved of all administrative responsibilities during the training period. All sixty principals in the district will eventually be included in such a program.

Research with Interaction Analysis has shown that change in teacher behavior can be facilitated through understanding of and skill in the use of this instrument. The university team and the directors of the staff development project were concerned with implementing previously tested procedures with Interaction Analysis. Thus, the initial training effort was directed at mastery of the classification system using the training manual developed by Amidon and Flanders. The trainees practiced with audio tapes until they had acquired sufficient skill in classifying classroom talk, entering the tallies on the matrix, and doing preliminary matrix interpretation.

During this period of training, project participants visited classrooms to observe and tape teachers who volunteered material for Interaction Analysis. This permitted the project principals to use Interaction Analysis in a setting where they had direct contact with and could discuss the teacher's objectives for the lesson and reactions to the class hour. The taped material provided further training in classification of teacher-pupil behavior and preparation of matrices for interpretation of interaction patterns of teaching strategies. The second part of the training by the university team dealt with teacher questioning strategies, including a consideration of different types of questions and student responses and a system for analyzing and classifying type and level of teacher-student talk.

The teaching phase provided the principals an opportunity to implement new procedures and teaching strategies developed in the "instructional phase." Lessons were planned to try out various teaching patterns, and the interaction process was recorded on tape for comparison with the actual classroom behavior. Various lessons were recorded for further analysis with the university training team.

In the third phase of the training following their teaching experience, the principals analyzed audio tapes of their own lessons, which they had previously tallied and entered on matrices. This additional practice provided the opportunity to improve rater reliability and to clarify difficulties encountered in using Interaction Analysis in the field experience.

Another aspect of training in this phase dealt with the participants' feelings about the use of recording equipment and Interaction Analysis. On the basis of their own experience, the principals were able to anticipate some of the feelings their teachers might have when they introduce Interaction Analysis into their own schools. Handling possible negative evaluations was important in these discussions.

In the supervisory phase of the project, the principals were concerned with strategies for implementing new procedures with their staffs. To develop a nonthreatening environment which encouraged teacher self-analysis, it was suggested that project principals work primarily with volunteers from the teaching staff during the four-week supervisory period. In actual practice, the principals usually met with their teaching staffs and explained the nature of the program in which they had been participating and illustrated with tapes their own use of Interaction Analysis and the analysis of questioning strategies. In numerous instances, participants worked a great deal of their time directly with interested teachers in the classroom. Teachers were encouraged to acquire skill in (1) identifying patterns of teacher influence on students, (2) analyzing teacher patterns of behavior in light of goals set for a lesson, (3) planning alternative patterns of behavior to replace those not achieving goals, (4) differentiating narrow and broad questions, and (5) identifying levels of thinking required in answering different questions.

The university team suggested certain strategies for implementing Interaction Analysis and other procedures at the classroom level. One approach was to stress the self-help feature of Interaction Analysis, and particularly its use in providing teachers with objective, systematic feedback on classroom verbal interaction.

Since the project principals had used the system in their own teaching, they were aware of possible misconceptions about the use of Interaction Analysis, and they saw the need to consider the purpose of a lesson in evaluating the nature of the teacher-pupil interaction pattern. They were also aware of the tendency to think of certain interaction patterns as value-laden. Unless behavior is carefully related to goals, it is difficult to avoid the negative connotation of Interaction Analysis patterns such as direct or indirect teacher influence. Even certain categories such as giving directions or criticizing student behavior can be negatively perceived by a teacher who is not aware of the empirical, classificatory nature of the categories.

As a guideline for use, it was suggested that a teacher use this technique of self-evaluation in privacy and maintain control over its use. This suggestion became a clearly stated policy that the teacher has the right to erase taped material when finished using it. Such privacy is considered necessary in building confidence in the administrative process of assisting teachers in professional growth—it substantiates the administrator's desire to maintain the integrity and autonomy of his staff. According to this point of view, if teachers have confidence in the administrator's concern for their professional integrity, the principal would then be able to offer help in instructional supervision in an atmosphere of growth and trust.

As one strategy for implementing Interaction Analysis in supervision, the university team introduced the concept of Interaction Analysis as a "microlanguage," which was found to be useful on their campus in communicating about teaching acts. Viewed as microlanguage, the ten categories of Interaction Analysis are of particular value in communicating about classroom behavior because they may be used to described all verbal behavior in the classroom. The concept of Interaction Analysis as a microlanguage is also enhanced by the one hundred cells of the matrix, each of which also has a specific meaning. Teaching behaviors can be described and learned by teachers without resorting to technical, professional jargon, and the simplicity of the language makes learning of new behaviors much simpler and more exact.

The use of the microlanguage is illustrated in the discussion of "teaching patterns" which was presented to the project principals. The most persistent behaviors used by a teacher in a lesson are defined as a "teaching pattern," and these can be gleaned from a matrix. A lesson in which the major teacher behavior is asking questions and making positive evaluations of student answers can be described in microlanguage as a 4-8-2 pattern—4 (teacher question), 8 (response from the student where the answer is highly predictable), and 2 (teacher praise). Project principals were introduced to a number of these common patterns and practiced identifying teaching strategies using tapes of their own classroom interactions.

The usefulness of teaching pattern analysis in answering classroom instructional problems was stressed. Some of the "teaching patterns" are useful for achieving particular classroom goals. For example, a common pattern found in research is the 4-8-3 interaction sequence in which the teacher asks a question (4), obtains the expected response from the student (8), and accepts the answer without evaluation (3). The 4-8-3 pattern produces certain consistent behaviors when used in any subject area. Since there is no evaluative statement by the teacher, the child who fears criticism is generally more willing to participate.

More complex patterns were also introduced and discussed. For example, a lesson may begin with a 4-8-3 pattern, followed by a 4-9-3 sequence in which the teacher is asking a question, the student is giving a response, and the teacher is accepting the response without evaluation. The "9" response indicates that the question cues the student to give a less predictable answer or to supply his own ideas. As the lesson progresses, the teacher may be interested in having the students develop and evaluate their own ideas. This implies a 9-10-9 pattern, a student response followed by another student response without a teacher comment. This pattern could be a lesson in which the teacher started by asking data-type questions and then asked students to use this data in making predictions. Here, the teacher intended that the 4-9-3 pattern evolve into a 9-10-9 pattern —shift from a teacher directed discussion to one allowing the children to evaluate their own ideas.

Illustrations of teaching patterns and practice in identifying them demonstrated how a teacher who has a clearly stated lesson purpose can use Interaction Analysis to evaluate its effectiveness without the presence of a supervisor. A similar approach was used in analyzing questioning strategies.

Two groups of project principals took part in the staff development program during the first year. Their reactions have shown the need for certain revisions. After the first group completed the ten-week training phase, it was decided that the district staff should present the initial exposure to Interaction Analysis and thus make better use of the university staff by allowing them to concentrate on interpretation and application.

Problems of advance scheduling are significant in considering such a project in a school district. An unexpected lag in implementing certain procedures developed because special programs and schedules for staff that were already established prohibited the project principals from initiating new procedures such as training in Interaction Analysis during the first year.

A major theme in any staff development program is the trained personnel in a district. To be most effective, this group must have the opportunity to train others, and the university training team recommended that they: (1) train the teachers who were released from classroom duties during the project in the use of Interaction Analysis, questioning skills, teaching patterns, and microteaching; (2) provide seminars for the administrative interns, with an orientation to the skills learned in the project and in administrative procedures; and (3) replace the university training team as soon as possible to make the best possible use of resources for staff development. Teaching them the cluster of skills would increase their feelings of competence and understanding of the central concepts of the project.

Those who participated in the project have generally had positive feelings. However, some of the classroom teachers who were temporarily replaced by the administrators consider their assignment to substitute duty a negative experience. The district's plan to include an inservice education program recommended by the university should help to correct this problem. These inservice programs would free teachers from substitute duties for four days during the four-week period. Also, the time spent in substitute teaching would be used to collect audio-tapes for their analysis as a part of their training in teaching patterns.

The project is now in its second year. Evaluation of the inservice program initiated by the project principals in their own schools will be undertaken during this year.

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tip

gesture . . .

Another characteristic of all teachers, regardless of where or what they teach, is that they send and receive messages without saying or hearing a word. They engage in nonverbal communication. Using a model for analysis of nonverbal behavior provides an objective way of looking at and classifying this nebulous but critical component of teaching.

Nonverbal Communication

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Many teachers rely upon words and verbalisms to convey meaning during instruction. They believe that teaching is telling. They readily accept the notion that to be instructive is to be verbal, or, that to be verbal is to be instructive. They view words as the very miracles of learning. "How many times will I have to *explain* this?" "Haven't I *explained* that a hundred times already?" "Were you listening when I *told* you that?" "Alright, everybody pay attention—I am only going to *say* this one more time." Although these statements by teachers do not characterize teaching, they do portray a reliance on the power of words.

Teachers constantly check on the fidelity of student verbal remarks by reading their nonverbal cues, but they miss the fact that by interpreting and inferring from these nonverbal expressions, pupils obtain the full impact of teacher motivations and feelings. It is much more "fun" to think that enlightenment is one way—that teachers are free to observe and read the behaviors of students with an open license. But the real point is that teachers convey information to students through nonverbal behavior, and this is what it is they overlook.

Words and verbalisms may be the preferred symbols of coming to know, but they do not represent the only means of knowing. Nonverbal cues and clues represent elegant signs for conveying and receiving information, for actions do speak as loud as words—perhaps, louder.

To recognize that how we say something is as important as what we say is difficult to grasp because little conscious thought is given to the process of providing information through nonverbal action. We are usually *unaware of our own awareness.*

Immediately understanding another and having the other understand us is commonly referred to as empathy. In fact, most of us believe that the most personal and valid kinds of information can be discovered this way. Yet, we rarely attribute our understanding to the influence of nonverbal communication. It is by reacting to the nonverbal cues of others—to their facial expressions, movements, postures, mannerisms, vocal tones, gestures, energy changes, etc.—that we pick up information which we use in deciding what to do next and in determining what our role needs to be. All of this expressive activity seems so natural and spontaneous to us that we overlook the fact that we influence and are influenced by others through nonverbal action.

Nonverbal cues may also be calculatingly managed to achieve a desired effect, to effect an impression, or to convey an attitude. The females of our culture have long since learned the significance of exchanging mutual glances with males. This is perhaps the most efficient and quickest way for two parties to convey immediate attraction for each other. You do not engage in a warm mutual glance with another if you are disinterested. Females understand the consequences of mutual glances so well that they are capable of looking around, through, and by a male to avoid his gaze and to avoid attention. They do this without drawing attention to themselves. It seems natural. Yet, the motive for action may be intentionally conceived and the expression deliberately managed.

We engineer expressions to convince others how we wish to be viewed. Such is the case when we take a driver's test to obtain a license, go to church, or listen to an instructor in a classroom. We may begin by deliberately engineering our performance to convince an observer of the realness of our participation, but there is a very good chance that we too begin to believe that our performance is authentic.

Whether nonverbal cues are spontaneously expressed or deliberately managed, either condition influences perceptions. While it is often difficult to detect the difference between the two kinds of cue-giving, nonverbal information facilitates efforts to understand others and to be understood. Whether a person deliberately chooses to react to nonverbal cues or whether he unconsciously does so, the crucial conclusion is that expressive cues influence perceptions. Both teachers and students take the expressive state of the other as symptomatic of inner feelings and attitudes. These cues are not taken at face value, but inferences are made from them to determine what to believe. Sometimes students will respond to a precise expression and know that a teacher is angry and hostile or sad and depressed. Teachers often read the facial expressions of a student to discover whether he is elated or unhappy.

In a psychological sense, teacher-pupil contacts are distinguished by spontaneity and immediate response. Therefore, nonverbal reactions are especially prominent for the formation of attitudes since they stem from unwitting responses. Not only are teachers quite likely to be unaware of their own behavior, but they can unwittingly reveal feelings to students that are not in their own best interests. Teachers must be on the alert to discover these possibilities after they occur, for the probability of preventing their occurrence is quite difficult. To increase an awareness of the psychological consequences of what is ordinarily out-of-awareness is a step in the right direction. Attitudinal displays and emotional reactions are not peculiar to classrooms, but the need to be open to the meaning of their appearance is greater than imagined.

In any classroom the exchange of messages that are nonverbal in character often plays a more significant role in student learning than the formal teaching which takes place. Throughout a teaching day, there are many occurrences which have an impact on the course and direction of classroom activity and which shape the contextual meaning derived from a situation. These are nonverbal phenomena that involve the use of the body, use of space, and even use of time. Not only do they minimize verbal messages, but they become the real focus of attention—the idea that lingers long after the event has passed. Why this should be so is most difficult to determine, but the character and influence of these events speak for themselves.

Use of Space. Classrooms are usually divided into territories where a teacher and students occupy space. Some arrangements are traditional, with the teacher's desk at the front of the room and students seated in rows. Other arrangements of desks and furniture are more imaginative. A change in a spatial arrangement influences the potential meaning of a learning context.

Teacher Travel. Where and when a teacher chooses to travel in a classroom signifies meaning. Some teachers move around their desks as if they were isles of security. They rarely venture into the territories of student residence unless they wish to check or monitor seatwork. To move forward or away from students signifies relationships.

Use of Time. How teachers use their time indicates the value and importance they place on something. Spending little time on a topic or passing by it can indicate no interest or knowledge about the topic. Teachers do not ordinarily recognize the meanings of their use of time, but students can frequently relate what a teacher's preferences are and what the teacher dislikes.

Control Maneuvers. Teachers engage in various nonverbal tactics to control the behavior of students. These silent expressions serve as singular events to remind students of teacher expectations. For example, a teacher often indicates inability to hear due to a classroom noise, places finger to lips, stands with hands on hips and stares in silence, scans room to see who is not working, records in grade book while student reports, or raises brow or uses eyes to gain attention.

The acts of a teacher suggest a reflection of the teacher's self. By interpreting and inferring from nonverbal cues, pupils attempt to obtain a fuller understanding of the teacher. Since pupils assume that these cues are more consonant with the actual feelings and thoughts of a teacher, pupils who detect contradictions between verbal and nonverbal behavior will accept the nonverbal as more valid. Therefore, what a teacher says makes little difference if it is incongruent with what he does. When there is an incongruency between the verbal and nonverbal, students are troubled by the dilemma, and they see through to the teacher's real self.

Communication theorists vary considerably in their views of human interaction, and models of the process can be needlessly abstract. Explanations range from the Shannon-Weaver model, which describes electronic communication, to the Ruesch-Bateson description which includes anything to which persons can assign meaning. However, the four major ingredients that researchers agree are common to human communication are: (1) sender, (2) message, (3) channel, and (4) receiver.

A sender of communication has ideas, interests, information, needs, and sentiments which he attempts to encode in the form of messages. Given a sender who sends messages, a channel is necessary. The channel is the carrier of messages, the medium, or the vehicular means for transmitting messages. The communication channels are the verbal and the nonverbal skills possessed by the sender and the sensory skills possessed by the receiver. Once the message is decoded by the receiver, it has reached a destination which can be considered the response, interpretation, or meaning the receiver assigns to the message. If the receiver answers, the communication cycle begins anew.

The teacher's nonverbal behavior constitutes a model that represents six dimensions of nonverbal activity on a continuum ranging from encouraging to restricting communication, as follows:

TEACHER COMMUNICATION
Encouraging—Restricting
Congruity—Incongruity
Responsive—Unresponsive
Positive—Negative Affectivity
Attentive—Inattentive
Facilitating—Unreceptive
Supportive—Disapproving

Congruity—Incongruity. This dimension refers to the congruity or incongruity that exists between the voice, gesture, and actions of the teacher and the verbal content communicated by the teacher. Congruity occurs when the teacher's verbal message is supported and reinforced by nonverbal behaviors to the extent that there is consonance between verbal intent and nonverbal referents. A mixed message or incongruity exists when there is a discrepancy or contradiction between the verbal message and nonverbal information.

Responsive—Unresponsive. A responsive act relates to modifications in the teacher's behavior as a result of feedback. Verbal feedback occurs when the teacher hears himself talking, but nonverbal feedback is based on the reactions and responses of pupils to the teacher. A responsive act occurs when the teacher alters the pace or direction of a lesson as a result of a detection of misunderstanding or feelings by pupils. Operating on the basis of pupil behavior the teacher uses feedback data to "feedforward" with changed information. Unresponsive acts are an ignoring of or an insensitivity to the behavioral responses of pupils.

Positive—Negative Affectivity. Positive nonverbal expressions convey warm feelings, high regard, cheerful enthusiasm, displays of liking, and acceptance. Negative nonverbal expressions convey aloofness, coldness, low regard, indifference, or display of rejection.

Attentive—Inattentive. Nonverbal expressions may imply a willingness to listen with patience and interest to pupil talk. By paying attention, the teacher exhibits an interest in pupils. By being inattentive or disinterested, the teacher inhibits the flow of communication from pupils, and neither sustains nor encourages sharing information or expressing ideas.

Facilitating—Unreceptive. The teacher is facilitating when acting to perform a function which helps a pupil, usually in response to a detection of pupil needs, urgencies, or problems. This may be in response to a pupil request or a nurturant act. An unreceptive act openly ignores a pupil when a response would ordinarily be expected, may ignore a question or request, or may be tangential response.

Supportive—Disapproving. Expressions supportive of pupil behavior or pupil interactions manifest approval, indicate being strongly pleased, exhibit encouragement, or connote enjoyment or praise. Disapproving expressions convey dissatisfaction, discouragement, disparagement, or punishment. The expression may be one of frowning, scowling, or threatening glances.

Viewing a teacher's nonverbal communication as an encouraging to restricting continuum has the advantage of being related to the communication process and of being indicative of subsequent interpersonal relationships between a teacher and pupils. The model is also useful in regarding the potential influence and consequence of a teacher's nonverbal behavior with pupils. This conceptualization reflects a process point of view: an action system of nonverbal behaviors that exists in dynamic relationship to the continuing influence of the teacher and pupil in interaction.

A requirement of communication in the classroom is that the symbols a teacher chooses from his repertoire must satisfy his own peculiar requirements and meaning and must evoke a similar meaning in the pupil. Communication is successful when the teacher and pupil agree on the interpretation that should be put on the message. Perfect communication is rarely achieved, however, because words are at best mediating symbols between the expressed intent of an inner state of being and the achieved effect they elicit.

Because we can hear ourselves when we talk, adjustments can be made in the intent of our verbal speech. If something uttered verbally does not sound appropriate, it can be restated—we can correct our messages to others. Oral communication permits this marvelous facility for receiving instantaneous feedback of what has been said. Teachers have in fact often suggested that they were not precisely sure of what they thought until they heard themselves speak. Our words become data not only for others but for ourselves, and we can capitalize on our utterances as sort of a feedback-loop to determine if our words meet our test of intent and meaning.

Feedback data from our expression of nonverbal cues are not, however, so easily available; the process is different. We cannot see ourselves when we behave. If we lived in a "world of mirrors" perhaps nonverbal cues could be as easily manipulated as verbal behavior, but this is not the case. We have to rely on the reactions and responses of others in order to comprehend our nonverbal effect in a situation. In the classroom, attending to the responses of students is the major source of information. Teachers differ markedly in their ability to be sensitive to the behavior of youngsters toward them and to use it as feedback data.

The prospect of training teachers to become more knowledgeable of nonverbal cues is in the process of greater development. For the present, it must be stressed that a greater openness to the occurrence of nonverbal events and expressions, plus a greater awareness of student behavior, is the major key. The feedback-loop for the nonverbal is necessarily contingent in great part on the reflective mirror of student reaction and response.

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The Model in Use (Nonverbal Communication)

If teachers are to become more effective in the classroom, they need to become attentive not only to *what* they are communicating but also to *how* they are communicating. They need to know the significance of their nonverbal behavior.

Although nonverbal behavior often reflects their real feelings and attitudes, most teachers are not aware of what they are communicating nonverbally. They teach with little knowledge of their personal attitudes and how these color teaching behavior through nonverbal behavior. Delving into the world of the nonverbal is an interesting experience. In the beginning, only the very obvious can be perceived. However, as sensitivity to this form of communication increases, things that were only vague feelings come into sharper focus.

At the University of Kentucky, systematic observation of nonverbal as well as verbal behaviors has become an important tool to evaluate students' performance in two teacher preparation programs, the Teacher Corps and the Prospective Teacher Fellowship Program. Both programs prepare elementary teachers to work in schools serving disadvantaged children through an oncampus preservice period of graduate studies combined with field experience. An internship follows in which the University staff continues to work closely with the students.

The close, intensive work between staff and students offers a rare opportunity to systematically evaluate the progress in achieving the goals of the two programs to prepare skilled teachers who understand the needs of the disadvantaged youngster and who want to teach him.

During the first year of the programs, evaluation of teaching performance was limited to rating scales, anecdotal reports, and the like. While these were helpful in many ways, they were also frustrating to use because there was too much opportunity for subjective opinion to enter. More objective instruments were needed to collect reliable data for analysis, and two were selected: Flanders' System of Interaction Analysis and Galloway's Analysis of Nonverbal Communication. Flanders' System provides information on *what* is said, and Galloway's Analysis deals with *how* things are said; they are used in combination.

Galloway has developed two categories for nonverbal communication to further describe each category of the Flanders' System of Verbal Interaction. With the exception of Flanders' first category which doesn't need extension or qualification, there is one nonverbal category for use when the verbal encourages interaction and one nonverbal category for use when the verbal restricts interaction. This system does not attempt to cover all of the kinds of nonverbal communication given by the teacher, but it does give very useful information in several important areas.

Summary of Categories for Interaction Analysis Using Nonverbal Categories

Verbal[1] (Flanders)			Nonverbal (Galloway)	
			Encouraging	Restricting
TEACHER TALK	Indirect Influence	1. ACCEPTS FEELING	1.	11.
		2. PRAISES OR ENCOURAGES	2. CONGRUENT: nonverbal cues reinforce and further clarify the credibility of a verbal message.	12. INCONGRUENT: contradiction occurs between verbal and nonverbal cues.
		3. ACCEPTS OR USES IDEAS OF STUDENT	3. IMPLEMENT: implementation occurs when the teacher actually uses student's idea either by discussing it, reflecting on it, or turning it to the class for consideration.	13. PERFUNCTORY: perfunctory use occurs when the teacher merely recognizes or acknowledges student's idea by automatically repeating or restating it.
		4. ASKS QUESTIONS	4. PERSONAL: face-to-face confrontation.	14. IMPERSONAL: avoidance of verbal interchange in which mutual glances are exchanged.
	Direct Influence	5. LECTURES	5. RESPONSIVE: change in teacher's pace or direction of talk in response to student behavior, i.e., bored, disinterested, or inattentive.	15. UNRESPONSIVE: inability or unwillingness to alter the pace or direction of lecture disregarding pupil cues.
		6. GIVES DIRECTIONS	6. INVOLVE: students are involved in a clarification or maintenance of learning tasks.	16. DISMISS: teacher dismisses or controls student behavior.
		7. CRITICISMS OR JUSTIFIED AUTHORITY	7. FIRM: criticisms which evaluate a situation cleanly and crisply and clarify expectations for the situation.	17. HARSH: criticisms which are hostile, severe, and often denote aggressive or defensive behavior.
STUDENT TALK		8. STUDENT TALK-RESPONSE	8. & 9. RECEPTIVE: involves attitude of listening and interest, facial involvement, and eye contact.	18. & 19. INATTENTIVE: involves a lack of attending eye contact and teacher travel or movement.
		9. STUDENT TALK-INITIATION		
		10. SILENCE OR CONFUSION	10. COMFORT: silences characterized by times of reflection, thought, or work.	20. DISTRESS: instances of embarrassment or tension-filled moments, usually reflecting disorganization and disorientation.

[1] For a complete and detailed discussion of the verbal categories in this summary, see the article in this issue by Edmund J. Amidon on "Interaction Analysis and Teacher Education," pp. 159–67.

The combined verbal and nonverbal system is relatively easy to learn. For the person who knows the Flanders System there are no new numbers to learn. One simply writes down the number of the verbal category and, if it is nonverbally encouraging, it is left as is. If it is nonverbally restrictive, a 1 is added in front of the number. Thus, if the teacher gives praise (which is a verbal 2) but it is restrictive, he is given a 12. A summary of the combined system is presented on the opposite page. The use of the combined verbal and nonverbal system makes the resulting analysis more complex but easier to understand.

Categories 2 and 12 indicate whether the praise or encouragement by the teacher is believable or not. It is surprising how much of it is not—many teachers seem to use the word "good" almost as a punctuation mark. It is possible to individually "praise" thirty pupils in five minutes using this kind of "praise." Whether the pupils actually feel praised is a moot point.

Categories 3 and 13 indicate whether the teacher really accepts and implements a student's idea. It is rather discouraging to find that few teachers appear to be able to really work with the ideas presented by pupils. A word or two of perfunctory acknowledgement is often all that is given.

Categories 4 and 14 indicate the way in which the teacher asks questions. Asking a question is a direct method for inviting pupil interaction. However, when delivered in an impersonal way, a question may actually discourage interaction if it is asked in the manner of a drill sergeant barking orders or in a manner indicating complete boredom.

Categories 5 and 15 indicate whether the pupils are really attentive as information or teacher opinions are given. It is not uncommon to see a lecture start off well but continue to the point that the pupils lose interest. The teacher who is sensitive to the situation will do something to remedy it immediately. If nothing is done and the teacher continues to lecture in the same way, the pupils may show restlessness or boredom; discipline problems may easily develop if the lecture goes beyond this point. However, one may find extended teacher lectures that are interspersed with extended pupil talk because the presentation is so interesting that pupils get excited and interrupt them.

Categories 6 and 16 indicate whether directions that are given invite pupil interaction or discourage it. Often the teacher will give directions at the end of a lesson for further work to be done by the pupil as independent study. After allowing time to make sure that the directions are understood, the teacher may then choose to use directions which indicate to the pupil that the interaction for that particular activity is concluded and that he is expected to work on his own.

Categories 7 and 17 indicate whether criticisms are firm or harsh. Done in a firm kindly manner, they can promote further class interaction. Done in a harsh manner, they may discourage further interaction of a constructive nature.

Categories 8 and 18 and 9 and 19 indicate not only the kind of student response but also the teacher's response to it. The receptive teacher listens when the pupil is talking. He looks at the pupil and his face shows his attentiveness. The inattentive teacher does not evidence involvement when the pupil is speaking.

Categories 10 and 20 indicate silence or confusion and whether the pupils are showing comfort or distress. Silence can mean that everyone is thinking or working, or it can be full of tension. Confusion may mean that several groups of people are talking at the same time, or it can be chaos. The addition of the nonverbal to this category makes it much more useful in analyzing actual classroom activity.

The use of the nonverbal analysis along with verbal analysis enables persons working with teachers, interns, and student teachers to have far more information to utilize. For the purposes of analysis in Flanders' System, the ID ratio is determined; this refers to the ratio between indirect teacher talk and direct teacher talk. The total of the tallies in columns 1, 2, 3, and 4 is divided by the total of the tallies in columns 5, 6, and 7. Thus, an ID ratio of 1.25 would indicate that for every direct statement there are 1.25 indirect statements. The total of the tallies in columns 1, 2, 3, and 4 may also be divided by the total of the tallies in columns 1, 2, 3, 4, 5, 6, and 7 to show what percentage of the total teacher talk was indirect. The revised ID ratio is developed in the same way omitting columns 4 and 5; it is made to determine the kind of emphasis given to motivation and control, whether it is indirect or direct. Pattern analysis refers to the principal ways in which the verbal interaction takes place—it is usually initiated by the teacher, followed by a student response, followed by one or more teacher responses.

Analysis of nonverbal communication may be done in several ways, but two types seem to be especially helpful. A percentage of restricting communication for the total classroom time can be obtained by dividing the number of restricting tallies by the total number of tallies. This can also be done to find the percentage of restricting tallies for each verbal category.

The combination of matrix analysis, pattern analysis, and nonverbal analysis gives a good picture of the teacher's behavior. Discussion of the data helps the teacher to become aware of behavior and to learn to choose the teaching patterns appropriate to specific goals in various lessons. Several examples are given below to illustrate implications for data analysis.

Teacher A. Teacher A works with a fourth grade group in a ghetto school. Her ID ratio is 2.23, indicating that she spends 69 per cent of her time using indirect methods of teaching. Her revised ID ratio is 2.63, indicating that she uses an indirect approach to motivation and control 72 per cent of the time. Her teaching pattern is question-answer-praise. Sixteen per cent of this teacher's total behavior is restricting, with all of this type of behavior occurring in the praise and acceptance-of-ideas categories.

In another lesson teaching a different subject this teacher also has the same question-answer-praise pattern, but this time her ID ratio is 1.40. In this instance, she is using indirect methods 58 per cent of the time. Her revised ID ratio is .86, which indicates an indirect approach to motivation and control 46 per cent of the time. Of the total classroom time, 10 per cent is restricting—70 per cent of this behavior occurring in the praise category.

Teacher A is a teacher who uses indirect methods in a rather mechanical way. Insofar as her verbal behavior goes, she is in a dismal rut. While she is trying to give pupils a sense of accomplishment, she is not succeeding. This teacher needs to learn to ask questions of a broader nature and to handle student responses in a different manner.

Teacher B. Teacher B also works with a group of fourth graders in a ghetto school, but he is quite different. His ID ratio is 1.84, indicating that he spends 65 per cent of his time using indirect methods of teaching. His revised ID ratio is .73, indicating that he uses an indirect approach to motivation and control 42 per cent of the time. His teaching pattern is question-answer-praise. A look at nonverbal behavior indicates that most of this praise is incongruent—not convincing. Eleven per cent of this teacher's total behavior is restricting, with most of that falling into the praise category.

In another teaching situation, his ID ratio was .94, indicating indirect methods were used 48 per cent of the time. A revised ID ratio of .41 reveals that he uses an indirect approach to motivation and control 29 per cent of the time. Restricting behavior is only 6 per cent of the time, and all of it is in the praise category. The most discouraging element of this lesson is the major pattern of verbal behavior. It is question-answer-criticism!

Teacher B obviously needs some help in improving his teaching techniques. He is bound by an inflexible mode of behavior. His major method is to ask a narrow question, followed by a student's answer, followed by either criticism or unconvincing praise, depending on the factual correctness of the answer. Very few students volunteer ideas and opinions because he seldom seeks them.

Without the use of the nonverbal analysis, certain aspects of this behavior would be puzzling and incomplete. The verbal analysis indicates two rather different patterns, question-answer-praise in one lesson and question-answer-criticism in the other. However, the praise was perfunctory and the criticism was not harsh, so that the two lessons were not so different after all. One wonders if a lesson where so much criticism is given might not be restricting, no matter how kindly the criticism is given.

Teacher C. Teacher C is working with a small group of first graders who live in a ghetto area. Her ID ratio shows that she uses direct methods of teaching 57 per cent of the time. Her revised ID ratio which indicates that she uses direct methods 81 per cent of the time in her approach to motivation and control. Teacher C's nonverbal analysis indicates that she is restricting less than 1 per cent of the time. According to further analysis of the verbal data, this teacher uses acceptance of feeling 3 per cent of the total classroom time; this is far more time than is ordinarily used in the classroom for clarification of students' emotions. Her major pattern is question-answer, and her minor pattern is direction giving-silence-information giving.

In another lesson, this same teacher has an ID ratio, which indicates that she uses indirect methods 75 per cent of the time. Her revised ID ratio indicates that she uses an indirect approach to motivation and control 63 per cent of the time. She uses restricting nonverbal behavior 1 per cent of the time, almost all of which falls into acceptance of ideas and praise. Six per cent of the total classroom time is spent in acceptance of feeling. The major verbal pattern is a simple question-answer-question.

What conclusions do these data indicate about Teacher C? First, she is quite flexible in her teaching methods—she is able to choose a pattern of behavior to meet the needs of the particular situation. Second, she is able to encourage interaction in both direct and indirect ways. Third, she is unusually sensitive to children's feelings. How can Teacher C be helped to improve her teaching methods? Greater effort toward giving genuine praise and more use of pupils' ideas would make this teacher even more effective than she already seems to be.

Analyses such as these indicate that there are considerable differences in the ways in which teachers say things. In the evaluation of student interns in the University of Kentucky programs, the differences in praise and acceptance of ideas have proven to be the most significant with student interns, and this has provided the means for frank discussion of ways in which one can respond to pupils. The verbal analysis has helped them see the need to develop greater flexibility in question-asking so that pupils will be encouraged to think at different levels, but the nonverbal analysis has helped them see the need for developing better ways of responding to students' ideas to encourage them to think further. The interns are also looking for opportunities to give more genuine praise that can really help the pupil to feel good about himself.

Although there have not been as many indications of restricting behavior within the other categories, still even a few may be quite important. This is particularly true for harsh criticism because even one such criticism can leave someone feeling crushed or humiliated. Furthermore, any indication of behavior of this type might mean that more of such behavior may go on when systematic observation is not being made.

Use of the nonverbal categories for the verbal lecture category is especially helpful in aiding the intern to become sensitive to the pupils' attentions and interests. Noticing when the pupils become inattentive and restless and then doing something constructive to remedy the situation can help to avert many discipline problems.

Through helping student interns to develop greater awareness of their teaching behavior in both the verbal and nonverbal categories, they will be able to become more encouraging and more flexible teachers. Our research is built upon this hypothesis. The interns are being video taped twice each semester for two semesters. They have the opportunity to see these tapes and discuss the analyses with a staff member. Results both in analysis and discussion of the tapes indicate that growth toward more effective teaching behavior is being made.

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Many institutions are using the microteaching model to raise the level of the teachers competencies to develop teaching skill. Microteaching is a system of controlled practice that makes it possible to focus on specific teaching behaviors and to practice teaching under controlled conditions. Competence in one skill is developed before proceeding to another skill.

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Microteaching

Microteaching is a scaled down teaching encounter. In microteaching, however, the complexities of the normal teaching encounter have been reduced and the level of feedback to the teacher has been greatly increased. Furthermore, the objectives of a given microteaching lesson are neither inadvertent, as is often the case with traditional practice teaching, nor are the appraisals of the experience purely subjective and arbitrary.

From a purely descriptive point of view, microteaching is quite simple. Its basic elements are a teacher, the microclass (usually four or five pupils), a short lesson of five to twenty minutes, and predetermined objectives which have been stated for the particular microteaching occasion. These seemingly limited parameters can be applied to purposes ranging from training, to diagnostic evaluation, to experiment with innovation.

The advantages of flexibility offered by microteaching are matched and indeed at some points derived from concomitant advantages in economy. If the objectives that are dealt with in the microteaching setting were attempted within the traditional teacher-training environment, the required educational resources would make such an experience prohibitively expensive.

In creating a microteaching setting, five essential conditions are combined:

1. Actual teaching takes place, even though the teacher and students are brought together specifically for practice.
2. The complexity of the normal teaching situation, including the number of students, the scope of the presentation, and the length of class time, are deliberately reduced.
3. The focus of teacher training is reduced in order to accomplish a specific task, such as the practice of instructional skills or techniques of teaching, the mastery of specific curriculum materials, or the demonstration of a particular teaching methodology.
4. A high degree of control over such diverse elements as time, the use of students, and the methods of feedback and supervision is structured into the training situation.
5. The typical feedback dimension in teaching is greatly expanded through an immediate follow-up critique utilizing sources such as the trainee's own analysis, students' reactions, and video tape, with the assistance of a colleague or a supervisor. Generally, the evaluation focuses on one particular aspect of the teacher trainee's performance, and an attempt is made immediately to translate the suggested improvements into actual practice during a second microteaching session shortly after the critique conference.

Microteaching has evolved as one part of an experimental teacher-education program supported by the Kettering and Ford foundations over the past several years. This program included research which identified specific teaching behaviors that can be isolated as observable skills as well as the development and testing of appraisal instruments that measured attainment of these skills. Microteaching itself was a by-product of this research, and continuing attempts are being made to identify new teaching skills and discover further experimental applications for microteaching.

During the past seven years, both the impact of microteaching and the evaluation instruments developed for assessing teacher trainee progress have been validated. For example, during one period of experimentation, teacher interns training ten hours per week in the microteaching clinic demonstrated a higher level of teaching competence at the end of eight weeks than did a similar group receiving separate instructions and experiences as teaching aides for an average of 20 to 25 hours per week.

In the six teaching skills subjected to experimental treatment within the microteaching setting, there were positive changes in intern performance. Teacher candidates in the microteaching clinic recorded a high acceptance of the microteaching technique and credited it with greatly increasing their perceptions of weaknesses and strengths in their own teaching performances. Significantly, performance in the microteaching situation accurately predicted subsequent success in classroom teaching.

When the defects of traditional teacher-training programs are considered, the economy of microteaching as a method of teacher training becomes more than apparent. In traditional programs, the teacher trainee must travel far and at too frequent intervals to get practice teaching experience, usually under spotty supervision with no student feedback. Microteaching offers the advantages of both the controlled laboratory environment and the reality of bona fide teaching. It is not a substitute for practice in teaching (for example, problems of discipline and classroom control cannot at present be dealt with in microteaching settings) but, certainly, it supplies some impressive alternatives such as close supervision, manageable objectives established according to individual training needs and progress, continuous diagnostic feedback, unprecedented opportunity for self-evaluation, immediate guidance in areas of demonstrated deficiency, and an opportunity to repeat a lesson conveniently as often as desirable.

Microteaching has many unique contributions it can make to education. First, the use of a microteaching setting can provide both beginning and experienced teachers with a safe practice environment for the development of competencies in the techniques and skills of the profession. Practice is an essential prerequisite for many learning activities; a significant portion of the typical teaching day is made up of activities that are learned and can be improved upon through practice. However, virtually all of the actual practice which occurs under the traditional preservice and inservice structure consists of on-the-job practice.

On-the-job practice in a normal classroom setting has severe limitations: (1) students are there to be taught, not practiced on, (2) practice of a specific skill or technique must fit well within a longer lesson specified for that particular day, and (3) there is only limited opportunity to receive feedback on the skill which is practiced. Teachers can utilize the practice setting of microteaching not only for skill training but also to try out new curriculum materials and instructional techniques.

As an instrument which focuses on specific teaching skills, the second major advantage of microteaching is its potential use as a means of providing improvement in the teacher's classroom performance. In the past, one of the major barriers to improvement has been the vagueness and mystique surrounding the teaching act. The fact that there is an artistic quality in an excellent teacher's performance does not preclude the need for a more precise way of describing and improving specific aspects of the teaching act. Teaching has been analyzed into various types of activities (for example: explaining, questioning, demonstrating), and the behaviors involved in certain teaching skills can be isolated and made the focus of training. After an individual teacher has identified a teaching activity or cluster of activities for improvement, microteaching provides a practice environment. By eliminating irrelevant concerns and providing immediate feedback from several sources, the microteaching setting allows the teacher to concentrate and thus make great progress in acquiring improved teaching proficiency in a very short period of time.

A third major contribution of microteaching is the development of a wide variety of readily available instructional skills models. Although there are many model teachers within the school setting, their influence on other teachers is diminished by their relative isolation within their classrooms and by the difficulty that a neophyte teacher has in separating an excellent teacher's performance into smaller, more digestible parts. A combination of video tapes focus-ing on a model teacher's performance in the classroom and a series of specifically designed microteaching video tapes demonstrating his individual technical skills would serve as excellent models for the beginning teacher.

Opportunities for new approaches to supervision is a fourth area in which microteaching contributes unique relevance. In schools today, no one really knows what teacher supervision has accomplished. Teachers are evaluated by principals during randomly selected class periods followed months later by other observations that usually involve entirely different circumstances—different instructional settings, different lessons, and perhaps even different classes, different grade levels, or different subject areas. Teachers have no real basis for perceiving, let alone changing, ineffective teaching patterns.

A microteaching clinic can provide a less threatening setting for supervision than traditional approaches to evaluation. Although most teachers are rather sensitive about having supervisors observe them in their classrooms, a microteaching clinic is considered neutral territory—the emphasis is on instructional help for the teacher. Whatever the specific goals of the microteaching lesson, both the teacher and the supervisor have a clear picture of those goals ahead of time. As a result, the critique period following the microlesson enables both the teacher and the supervisor to talk realistically about growth within the narrow range of mutual concern. Microteaching supervision tends to be highly specific, and the teacher can immediately apply a supervisor's suggestion in a reteach session. Microteaching could be applied to obtain consistent and constructive supervision and to train supervisors in helping teachers to improve their classroom performance.

A fifth use of a microteaching clinic within a school system is to test new instructional materials and techniques before their introduction to the classroom. Even the most experienced teacher can make serious misjudgments about the student experience or maturity required to learn a given set of materials or to function effectively under a new organizational structure. The microteaching clinic would provide an opportunity for quick judgments of student receptivity toward new curricular materials or instructional techniques. Teachers would also have the opportunity to gain mastery over materials before actual tryout in the classroom. To facilitate transition from self-contained classrooms to team teaching settings, microteaching provides opportunities for fledgling teaching teams to develop new materials and to test new modes of presentation while the other team members evaluate them. In the process, microteaching can serve as a catalytic element for bringing teachers together to discuss professional issues in light of a shared experience. It can be used as an effective neutral ground upon which to bring diverse elements within a faculty together to focus on the teaching-learning process.

* * *

From its inception as a simple device for the training of secondary school teachers in a few selected teaching skills, microteaching has grown to the point where multiple specific applications are being made at all levels of education, from the elementary school to the university. Preservice as well as inservice microteaching clinics and workshops have been established in many universities and public school systems throughout the country. Microteaching techniques and research have also been implemented with increasing frequency in new and different ways outside of teacher training, as in medical education.

There are numerous examples of usage within the field of education. At the University of Massachusetts, the regular preservice microteaching clinic is supplemented by an intensive summer workshop to train school personnel who can then return to their systems and establish microteaching clinics and practices on a local basis. At the University of Illinois, Arye Perlberg utilized microteaching in the preparation of vocational education personnel and in the refinement of teaching skills among university professors.[1] At the University of Maryland, David B. Young has used microteaching in teacher education centers to (1) train center faculty members to work with student teachers within the centers, and (2) to develop the teaching skills of student teachers. Young and his associates have also used microteaching and selected self-analysis techniques at Johns Hopkins University to individualize preservice training and internships for prospective teachers.[2]

The use of microteaching to train Peace Corps volunteers is an excellent example of its flexibility with unique teacher-training objectives. The microteaching clinic was adapted specifically to the preparation of the Peace Corps volunteers for the Philippines and has since become a

[1] Arye Perlberg, Professor of Education at Technion Institute in Haifa, Israel, was a Visiting Research Professor at the University of Illinois during the 1967–68 academic year.

[2] For a detailed discussion of the work performed by Young and his associates, see pp. 186–89 of this issue of *Theory Into Practice*.

model for other Peace Corps training programs. Objectives for the Philippine Peace Corps clinic were (1) to equip the volunteers with teaching skills directly related to English as a second language, (2) to acquaint them with special materials for teaching English as a second language, and (3) to provide a reality test during which the volunteers could decide if they really wanted to become elementary school teachers in the Philippines for the next two years. Since the microclasses were made up of Philippine students who had been in the United States less than six months, the microteaching sessions were much more directly related to the reality to be faced by the Peace Corps volunteers than would have been possible in a regular classroom situation.

An example of how microteaching concepts and techniques have been utilized in counseling and guidance has been provided by Allen Ivey. He and his associates[3] developed the concept of microcounseling, which is a video method of training counselors in the basic skills of counseling. Microcounseling training procedures focus on these skills: attending behavior, reflection of feeling, and summarization of feeling.

Microteaching techniques and principles have been used with some effectiveness in the area of medical education. Hilliard Jason, director of the Office of Medical Education Research and Development in the College of Human Medicine at Michigan State University, has utilized microteaching techniques in assisting medical students to acquire the skills of relating to patients. He is developing a series of process skills utilizing patient simulation, video taped patient-doctor relationships, immediate video playback, and supervisor-doctor critique and analysis.

Additional areas exist, both within and outside of education, where microteaching techniques and principles appear to be useful. For example, microteaching could be useful within education for preemployment prediction as a framework for selection or rating of experienced teachers seeking employment within a school district. This concept could also be extended to include the evaluation of current employees for possible promotion; however, it would be necessary to indicate clearly to teachers those occasions when their microteaching sessions would be utilized as the basis for evaluating their competency.

Microteaching principles and techniques might be effectively applied in the training of administrators to improve presentation skills, particularly in the area of administrator-parent communications. Such prior practice, combined with an effective supervisory critique of the administrator's micro-presentation, might result in a significant improvement in the administrator's ability to communicate with his community and might also result in an increase in the number of bond issues which are subsequently approved.

Another example of the possible application of microteaching is the training of personnel such as secretaries or receptionists. They might be trained in specific interpersonal relations skills to become more effective in dealing with the public. Teacher aides who would be working primarily with students (e.g., in open laboratories, resource centers, or cafeteria duty) could also receive such training.

Potential areas outside of education would include those service areas where information is obtained by a specialist from individual clients or from groups of clients such as social workers, psychiatrists, and police officers. Inservice teachers in diverse preparation institutions (hospitals, police academies, the military, and schools preparing social workers) could increase their competence through the use of microteaching procedures. Microteaching can also help to train people in the techniques of oratory and debate. Law school students could practice the skills of set induction, closure, and probing questions before a small audience. High school students, politicians, and ministers could improve speaking skills in a microteaching setting in which they could practice specific speaking skills on a small audience.

The normal classroom setting contains so many variables that precise research is virtually precluded. A major attraction of the microteaching format is that it simplifies the teaching act and provides an opportunity for real experimental control and manipulation of variables.

As a teacher training technique, microteaching is in its infancy, and many issues related to its most effective use have not as yet been resolved. There is no convincing research evidence regarding the optimal number of students for microteaching sessions. It would be useful to examine the impact of student characteristics upon the success or failure of the teacher training session and the impact of a variety of different timing and sequencing arrangements within the microteaching setting. Finally, how to increase the effectiveness of the self-confrontation critique and the feedback that it supplies in training teachers to acquire specific teaching skills must be determined. The important point here is that microteaching as a teacher training technique should proceed in light of a careful investigation of the contributions of each of its components.

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[3] The original research was conducted while Ivey was the Director of the Counseling Center at Colorado State University. He is currently at the University of Massachusetts.

The microteaching situation suggests that a second major category for research experimentation might focus upon the process of learning itself. Some of the learning situations which might be investigated relate to the use of models in the training of specific teaching skills. As noted in Allen and Ryan,[4] the key issues which might be examined are as follows. (1) Is a model of a skill a more efficient aid to learning if it contains the positive and negative instances of the skill or if it contains only the positive instances? (2) To what extent does extreme exaggeration of teaching techniques in a model add to or detract from its usefulness in a training situation? (3) Is transfer of the skill to the real classroom by the teacher trainee improved by the use of models in several different contextual situations (e.g., one in a microteaching situation, one in a regular classroom, and one in a large group lecture hall)? (4) Are modeling procedures more effective in producing learning if they contain segments which show the model being reinforced for performing the desired skill?

The supervisory sessions within microteaching also provide an opportunity for investigating some basic learning phenomena related to self-confrontation situations. Examples of the kinds of issues involved are: (1) the effectiveness of various schedules of reinforcement in training particular skills; (2) the effectiveness of different verbal and nonverbal reinforcers in training particular skills; (3) the relative training effectiveness of pointing out positive and/or negative instances of a training use of a particular skill in a self-confrontation situation; (4) the effects of training on different attitudinal sets and expectancy on the part of a supervisor; and (5) the investigation of supervisory techniques and cueing devices which can eventually eliminate the role of the supervisor and can make the trainee himself an adequate critic of his own teaching behavior.

A third major category of microteaching research would focus on the interactions between students and teachers. Teacher trainers must begin to face the problems of determining the relationships between teacher performance and student performance so that they can build empirically based justification for the objectives of their training programs. Video tapes on which the students and the teacher are recorded simultaneously will make it possible to do this. In addition to observing the immediate effect upon student behavior of a particular teaching skill, appropriate achievement measures could be given to the microclass students to determine the long range impact of the teaching skill upon student learning. As researchers begin to gather evidence in this area, we can begin to utilize teacher training programs where the skills, attitudes, and understandings required by prospective teachers are supported by the empirical evidence of their efficacy in producing learning.

Microteaching can and should be used as a research tool to investigate which training strategies are most effective for teacher trainees with different backgrounds and aptitudes. At the same time, it can be used as a training strategy to give individual teachers the kind of teaching most suited to their particular abilities. Such research into alternate training routes should provide educators with a means of approaching the problem of individualizing instruction within teacher education. There is a strong probability that teachers who are prepared in such an individualized program will subsequently be much more able to develop and implement individualized instructional approaches with their students.

While the four specific microteaching research categories which have been discussed are only those areas which today appear to be most fruitful, the most promising thing about microteaching as a research device is the extent to which it is open to new implementation and as yet unconceived experimental issues.

Microteaching stands today as one of the few experimental techniques which by its very structure encourages a combination of theory and practice, research and training, innovation and implementation. The phenomenal growth and diversity of microteaching should not obscure the fact that the technique is still in its infancy. The ultimate potential of this most promising tool for both research and training depends entirely upon our imagination and our ingenuity in developing and testing new ways of applying microteaching principles and techniques to the problems of education.

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[4] Allen, Dwight W., and Ryan, Kevin. *Microteaching*. Reading, Massachusetts: Addison-Wesley Publishing Co. (in press).

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The Model in Use (Microteaching)

In teacher training programs on campuses and in schools alike, microteaching is coming into its own. It is being used successfully in a wide variety of settings as a major teacher training technique in both preservice and inservice programs. Descriptions in this article of exemplary programs in which microteaching is an integral part illustrate the many purposes it can serve.

At the University of Maryland microteaching is a major technique in a program that focuses on continuous educational personnel development. It is conducted in a unique teacher education center, a cooperative effort of the university and several public schools that are geographically contiguous. Although it is coordinated by a full-time joint appointee, University personnel assume major responsibility for training center personnel for significant roles in the induction of student teachers into full-time professional teaching.

One of the major problems in attempting to establish microteaching as a major component is a shortage of trained personnel to conduct microteaching sequences. A second problem is the availability of pupils. To bring them to the campus often presents a major logistical obstacle. The University of Maryland has overcome many such problems in the teacher education center.

The major focus of work at the center is analysis and modification of teaching behavior. The instructional sequence is organized to prepare teachers to use Flanders' interaction analysis, Galloway's nonverbal continuum, and other systems for analyzing teaching including microteaching, video tape feedback, and simulation to modify behavior. A major portion of the instruction is "learning by doing" as center teachers use the systems with student teachers.

Microteaching is being incorporated into the program at three points: junior year experiences, prestudent teaching in methods courses, and concurrent with student teaching. The junior year experience consists of an observation to complement course work in psychology and human development and seminars with coordinators in teacher education centers. During these seminars, student teachers learn to use one or two basic teaching behaviors in a microteaching sequence. Prior to full-scale teaching, student teachers in several pilot projects are engaged in microteaching as a part of the "methods" courses. Following discussion of the relationship of a given dimension of teacher behavior to learning, student teachers identify specific teaching behaviors within that dimension and practice them in a microteaching sequence. For example, if the dimension of teaching behavior is developing alternative teacher responses to a pupil's questions and responses to questions, comments, and challenges, the following teaching behaviors would constitute the performance criteria:

1. Given a student question, comment, or challenge, the teacher can respond with: (a) praise accompanied with criteria for the praise; (b) a clarification question; (c) a counter-example; (d) reproof with criteria; (e) acceptance of feeling of student; or (f) statements using or building upon the student contribution.

2. When the teacher responds to a pupil, he discriminates in choosing responses "a" to "f" by weighing: (a) student nonverbal communication of anxiety; (b) student level of thinking; and (c) student statement of fact or opinion.

3. Given a student comment, the teacher can summarize the student's comment accurately.

4. After a pupil's response, the teacher can withhold verbal comment.

5. While a pupil responds, the teacher can establish and maintain eye contact.

6. After a pupil's response, the teacher can discriminate between, select, and administer reinforcement for correct answers.

7. Given a pupil's response, the teacher may: (a) probe the pupil for additional responses; (b) solicit a counterproposal or opinion; (c) nonverbally reinforce the answer or act of responding by writing the response on the chalkboard, smiling at the pupil, gesturing or nodding approval, approaching pupil, or physically contacting pupil; (d) solicit peer reinforcement of pupil's response; or (e) redirect the question to other pupils.

Microteaching sessions are conducted in the center using students from study halls or related content classes. Sessions may also be conducted after school with volunteer pupils. Students assigned to the material centers operate the video tape units. Three types of conferences have been used—supervisor, supervisor and peer, and peer alone. In each, the conference focuses on developing and using the specified behavior. In addition to viewing and discussing the teacher's performance, a video taped model may also be shown. The effectiveness of different conference strategies is currently being investigated.

During the student teaching experience in the center, supervising teachers conduct microteaching sessions for student teachers who are experiencing difficulty with certain teaching behaviors or seeking to experiment or refine a particular teaching strategy.

At Johns Hopkins University, microteaching with video tape feedback is used to teach interns systems for self-analysis of teaching behavior. Stressing such verbal and nonverbal classroom interaction provides continuous and individually prescribed training modules for the acquisition of teaching behaviors as well as graduated experiences prior to classroom teaching.

A microteaching clinic is conducted during the academic year preceding internship. Initially, each intern prepares and teaches a five-minute diagnostic lesson to four pupils. This performance is coded and analyzed using Hough's Observation System and/or Medley and Mitzel's Observation Scale and Record. Based on this analysis and inventory, a series of four microteaching training modules are prescribed for acquisition of the selected behaviors. In each, the number of times the intern reteaches is not predetermined but depends on his success. Following this series of four, the intern again teaches a "diagnostic" lesson, and another series of microteaching training modules are prescribed and conducted.

Microteaching sessions are held in private and public schools near the college campus. This not only alleviates the problem of obtaining pupils for the microclasses but interns become more familiar with the school environment. Prior to engaging in microteaching sequences, oncampus seminars are held to study the relationship of the designated teaching behaviors to pupil learning and to develop performance criteria. Constructed models of the behavior provide a basis for developing the performance criteria and also become an integral part of the supervisor conference in the microteaching session.

Subsequent to these individualized sequences, each intern teaches a twenty-minute lesson to ten students to be analyzed by his peers and retaught to a different group of pupils. The intern's next graduated experience is student teaching during the summer between the academic year and the internship. Microteaching sequences are arranged to provide the intern the opportunity to acquire additional teaching behaviors and/or to practice those behaviors with which he is experiencing difficulty.

Follow-up video tape feedback is also an integral part of the internship. This process applies some of the same basic principles. A portable video recording unit is used periodically to record the intern's classroom performance in order to analyze it, and a specific teaching behavior is selected for practice in a subsequent class period. This performance is also recorded and a confirmation conference held. The follow-up recording and analysis are made of the same or a similar lesson but in a different class.

Besides use over a period of time in such extensive projects as the University of Maryland and Johns Hopkins University programs, microteaching has been incorporated effectively in a variety of short-term workshops and clinics. Several brief examples of use in such abbreviated settings follow.

Inservice Workshops. In Hinesville, Georgia, elementary teachers participated in a four-day workshop on teaching physical education, which focused on the intensive study of the "content" of physical education. Instructors, representing the President's Council on Physical Fitness and the American Association for Health, Physical Education, and Recreation, demonstrated and led the teachers in various "learning by doing" instructional units in physical fitness activities, sports fundamentals, rhythmic movement, games, and posture exercises. In addition, specific teaching behaviors were identified for teaching the various units. Concurrent with these instructional sessions, other teachers were microteaching.

Four teaching stations were arranged, each equipped with a portable video tape recorder. All of the teachers paired and rotated a teacher/supervisor role.

Each teacher taught a lesson of his own choosing and then selected a teaching behavior to practice and analyze during the ensuing conference and to reteach. Each taught in two microteaching sequences.

Inservice Days. In Howard County, Maryland, forty new teachers participated in a microteaching teach-reteach sequence during a one-day workshop. Four teaching stations with video tapes were arranged. Each teacher selected a topic and taught and retaught a group of four students. The teacher then selected a dimension of teaching behavior and constructed specific criteria to use in analysis of his performance during the intervening critique. Selection of participants in the critique was at the teacher's option, and some chose a colleague and others a supervisor.

Training Leadership Teams. For a three-week conference sponsored by the National Science Foundation at the University of Maryland, microteaching was an integral part of a National Leadership Training Conference for teachers, supervisors, and university professors for the Earth Sciences Curriculum Project. The training program consisted of instruction on earth science, human factor analysis (a form of sensitivity training), and analysis and modification of teaching behavior. Each was conducted concurrently throughout the three weeks.

Each team developed a set of performance criteria (specific teaching behaviors) for different aspects of the investigative approach, and each team member (teacher, supervisor, professor) prepared and taught a five-minute lesson on some segment of earth science to five junior high students. They rotated the roles of video recorder operator, supervisor, and teacher. Each lesson was retaught to a different group of pupils following a conference which focused on the analysis of the performance using the specific criteria previously identified.

Although video tape recording is used in most of the programs described here, it is not requisite to conducting microteaching sessions. However, video tape feedback adds a potentially powerful dimension. Acheson and Olivero report that a conference with video tape feedback, compared with a conference without it, is significantly more effective in modifying a teacher's behavior. When a supervisor and teacher discuss a lesson, many times they do not share the same mental or visual-auditory frame of reference. Not only do they typically have somewhat differing attitudes about the content but they also see and hear different things. This lack of a common frame of reference complicates an already difficult task. However, video tape makes it possible to obtain a simple and objective record so that a supervisor and teacher can see, hear, and analyze the same phenomena.

The teacher may also want a respected colleague to help him analyze his performance. This has not been practiced extensively because it has not been feasible. Most teachers are teaching at the same time; however, with microteaching and a video recording, the two can sit down and view a lesson together. Besides giving them a common frame of reference, the important parts of the tape can be replayed as often as desired. There is great power for improvement in this type of vivid feedback and focused critique, and the very fact that colleagues are sitting down and discussing teaching together is of definite value to both.

Video tape recording provides the supervisor the means to provide discrimination training. As the video tape progresses, he can reinforce the teacher for each instance of the behavior by stopping the tape and telling the teachers, "You did that well, let's watch it again." He then replays that portion. Or, if the supervisor has noted in advance when he wants to reinforce the teacher, he can stop the tape and say, "Now, watch how well you respond to this student." Also, without stopping the tape, the supervisor can reward the teacher as the lesson progresses.

Another technique is to have the teacher contrast a variety of his behavior instances and reflect on their effectiveness, considering such things as the effect on pupils. The supervisor might also stop the tape following a given situation which is a cue for a teacher response and ask the teacher, "What could you do here?" The supervisor may want to prompt the teacher's response and/or suggest alternative behavior.

One of the most promising training modes is to present a model to the teacher during the conference in the microteaching sequence. Two basic kinds of modeling have been developed—perceptual and symbolic.

A perceptual model refers to a video taped teaching episode which exaggerates a specific teaching behavior. It is a constructed teaching-learning situation in a microteaching format. To prepare such a model, a teacher selects a topic and assembles a fifteen-minute lesson lending itself to the teaching skill to be modeled. The lesson is taught and retaught several times to different groups of pupils (normally four to five in number). On each occasion, as many distracting stimuli (behaviors other than the one desired) as possible are eliminated. The final modeled performance is usually five to seven minutes in length.

A symbolic model is a detailed written description of a specific teaching behavior to be acquired by the teacher and includes examples of the behavior and a rationale for its use.

Studies investigating the relative effectiveness of perceptual and symbolic modeling reveal that teachers and interns viewing a perceptual model incorporate more of the modeled teaching behavior into subsequent teaching than when studying a symbolic model. But, a combination of the two modeling modes is more effective than either alone.

Both the perceptual and symbolic models have served as a basic format for modeling studies in teacher education. Research on imitation learning (modeling) in fields other than teacher education has indicated that it is an effective means of accelerating the learning process. In teacher education, modeling has been demonstrated as an effective training variable in modifying a teacher's behavior in a microteaching sequence.

As an instrument which focuses on specific teaching skills, microteaching has many advantages. As these examples have shown, microteaching provides both the experienced and novice teacher the opportunity to analyze and modify teaching behavior with or without the assistance of a colleague or supervisor. For the experienced teacher, it offers the opportunity to acquire and practice new teaching skills and to refine existing ones. For the novice participating in this approach, it can eliminate much of the trauma, discouragement, and failure often accompanying a sudden immersion into the complexities of teaching.

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realities . . .

Simulation is another technique for practice which is being widely accepted. This technique introduces the teacher to the realities of the classroom in a controlled fashion and allows him to practice specific behaviors in a variety of realistic situations. An approach to simulation presented in this issue is the Teaching Problems Laboratory, which is an instrument to enhance sensitivity to the needs of pupils and to the environment and social factors affecting the school and its functions.

Simulation

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The imbalance and gap between indirect and direct experiences in teacher preparation programs is reflected in the often discussed dichotomy between theory and practice. Students and classroom teachers note that what they learn in the college classroom doesn't seem to apply in real-life school settings—that the two worlds are not in harmony. As early as 1904, Dewey was concerned with the need to relate theory to practice:

> *. . . we may . . . use practice work as an instrument in making real and vital theoretical instruction; the knowledge of subject-matter and of principles of education. This is the laboratory point of view. . . . Practice work thus . . . [gives] the student a better hold upon the educational significance of the subject-matter he is acquiring. . . .*[1]

More recently LaGrone stated:

> *The professional component of a program of teacher education for the last twenty-five or thirty years has taken for granted that the teacher education student will put together the talk about education and his teaching. The recent research in teaching and work in theory indicates that this is an extremely difficult task and that an assumption of this magnitude is more likely to be false than true.*[2]

Utilizing newer media and adapting an old training technique—simulation—it is possible for teacher educators to provide life-like learning situations in which theory and practice are joined. For example, a phenomenon such as "student behavior" may be recreated, observed, and then analyzed in terms of a variety of constructs which have been presented previously to students in theory classes. Among other phenomena, a simulated classroom setting provides opportunity to study teaching behavior, curriculum, social relationships, values, and individual differences. Further, the devised experiences, unlike individual case studies, can be placed in a realistic setting and systematized in such a way that one may participate as a hypothetical teacher in a long range, in-depth controlled experience which is both intellectually and psychologically engaging.

Many definitions exist for the term simulation, and the technique has been employed at several levels of sophistication. Herein, the term will refer to *the creation of realistic experiences to be played out by participants in order to provide them with life-like problem-*

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[1] Dewey, John. "The Relation of Theory to Practice in Education," *The Relation of Theory to Practice in the Education of Teachers*, National Society for the Scientific Study of Education, Third Yearbook. Chicago: University of Chicago Press, 1904, p. 9.

[2] LaGrone, Herbert. *A Proposal for the Revision of the Pre-Service Professional Program of Teacher Education.* Washington, D. C.: American Association of Colleges for Teacher Education, 1964, p. 63.

solving experiences related to their present or future work.

Simulations which have been created as training devices are well known. War games, which have been expanded and refined since they were first introduced in Ancient Greece, are one of the best examples of this technique. The best-known individualized simulator is the Link Flight trainer developed during World War II; today Eastern Airlines employs a simulated Boeing 727 jet for pilot training. The business sector has made a sizeable investment in simulator training. The American Management Association has developed and refined a "Top Management Decision Making Game," while Harvard University has created a "Harbits Company" wherein future corporation vice presidents practice "constructive failure." In education, simulation seems to have been employed successfully first in programs of driver training.[3]

Guetzkow has produced simulation materials for teaching basic concepts of balance of power, collective security, military aggression, isolationism, sovereignty, and international law among others.[4] Using similar materials at Lawrence, Kansas, Cherryholmes involved college preparatory students in a six-week simulation game in international relations. Three students were assigned to each nation, occupying positions of Central Decision Maker, Chief Diplomat, and Military Advisor.[5]

In the late 1950's, the University Council for Educational Administration in its Development for Criteria Study simulated the administrative position in the public elementary school.[6] Presented through films, filmstrips, tape recordings, and printed material, the simulation materials introduced each participant to Jefferson Township and the Whitman Elementary School. Following orientation, each participant assumes the role of "Marion Smith," principal, and engages in problem-solving activities involving administration and leadership. Kersh built a simulation laboratory at Oregon College of Education in which attempts were made to shape student teaching behavior using film clips and a feedback procedure.[7]

Other applications of simulation are developing rapidly in the fields of counselor training, teaching of reading, student teaching, preparing teachers to work in desegregated schools, preparing teachers to work in inner cities, teacher selection, and professional negotiations.

One effort which employs media to simulate a teaching environment is the Teaching Problems Laboratory.[8] Revised from an original study done by Broadbent and Cruickshank,[9] the laboratory creates the "Longacre Elementary School" in which participants assume the role of "Pat Taylor," a new fifth-grade teacher, and practice solving 31 critical teaching problems presented on film through role play and in written incidents.

Among other things, the laboratory experience is designed to permit participants to (1) assume the role of a new teacher, (2) have access to and use of related, appropriate professional information and materials and unfettered opportunities to solve critical problems of beginning teachers, (3) have exposure to a variety of potential solutions to particular problems, and (4) consider possible consequences of their problem-solving behavior.

The Teaching Problems Laboratory experience begins as Pat Taylor is introduced to the town of Madison and its school system in a filmstrip narrated by "Dr. Raymond Black," Superintendent of Schools. In the next filmstrip, "Frank Jones," the Longacre School principal, provides Pat with a detailed orientation to the school attendance district, the faculty, and the program. At the conclusion of the orientation session, Pat is given materials normally provided for a new staff member at Longacre including a faculty handbook of rules and regulations, a curriculum handbook, and cumulative record cards for 31 children. Sociograms and samples of children's work are provided. From this time on, each participant in effect becomes Pat Taylor.

Engagement occurs initially when Pat encounters "Jack Brogan," a constantly disrupting child, in a filmed classroom incident. Pat encounters 31 incidents, all representative of problems identified by teachers in service, from "having a distaste for grading papers" to "getting parents to take an interest in their children's behavior."[10] Ten of the incidents are presented in films, while the rest are encountered through role playing, written incidents, or combinations thereof.

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[3] Richards, William T. "Simulation: What Is It and What Does It Offer?" *Wisconsin Journal of Education,* April 1964, *96,* 12.

[4] Guetzkow, Harold, editor. *Simulation in Social Science: Readings.* New Jersey: Prentice-Hall, Inc., 1962.

[5] Cherryholmes, Cleo. "Developments in Simulation of International Relations in High School Teaching," *Phi Delta Kappan,* January 1965, *46,* 227–31.

[6] Hemphill, John, *et al. Administrative Performance and Personality.* New York: Teachers College, Columbia University, 1962.

[7] Kersh, Bert Y. "The Classroom Simulator," *Journal of Teacher Education,* March 1962, *13,* 109–10.

[8] Cruickshank, Donald R.; Broadbent, Frank W.; and Bubb, Roy. *Teaching Problems Laboratory.* Chicago: Science Research Associates, 1967.

[9] Cruickshank, Donald R., and Broadbent, Frank W. *The Simulation and Analysis of Problems of Beginning Teachers.* University of Tennessee and State University College at Brockport, New York: U. S. Office of Education Cooperative Research Project 5-0798, October 1968.

After encountering each teaching problem, Pat Taylor responds on an Incident Response Sheet which requires him or her to (1) identify the problem, (2) identify forces and factors affecting the problem environment, (3) locate pertinent information, (4) project alternative courses of action available, (5) select a "most desirable" course of action, and (6) communicate and implement a decision. Participants then move into small groups to project their solutions for reaction. Finally, a large group session further explores the problem.

There are no "correct" answers in this simulated experience. Rather, each participant is encouraged to "stretch" his teaching behavior by employing alternative solutions to classroom problems.

The simulated laboratory experiences require participants to construct a classroom test, hold parent conferences, prepare and teach meaningful lessons, locate instructional materials, develop a reading program, solve student behavior incidents, learn to use children's cumulative records, consider motivational techniques, prepare behavioral objectives for learning, analyze and use results of sociograms, provide for individual differences in learning, and so forth.

Results from two field tests conducted with undergraduates provide data in support of simulation techniques. Participants who underwent simulator training in place of the first two full weeks of student teaching reported that it was (1) very enjoyable, (2) realistic, (3) very helpful, (4) much more meaningful than college lectures, and (5) would be more valuable to them than the two weeks of student teaching they had missed.

Students also noted that (1) they felt involved in the devised situations, (2) the small group discussions were very helpful in aiding them to develop their own concepts of teaching, (3) the simulation experiences were very helpful in developing methods of coping with classroom problems, and (4) they would recommend simulation training to their friends.

Experimental data was collected during field tests to determine whether or not exposure to simulated critical teaching problems and subsequent decision-making had an observable effect on a trainee's student teaching behavior. The researchers concluded that:

> *simulation training when tested under the most stringent conditions was an unqualified success as a teaching device that motivates and involves students and that, although simulation was only partially successful in changing the student teachers' behavior, it was at least as effective as an equal amount of student teaching. Changes in the materials, placement in the program and in the role of the instructor promise to increase the overall effectiveness of this set of simulation materials in future trials.*[11]

In addition to providing a setting in which theory may be applied to practice, the Teaching Problems Laboratory and similar programs may serve to:

1. Provide intensive, focused opportunities to study and to analyze critical teaching problems which may not occur during student teaching or other preservice activities.
2. Increase student interest in the professional education sequence.
3. Provide opportunities for unfettered problem-solving free of censure and failure.
4. Shorten the required student teaching or internship requirement.
5. "Open" teaching behavior.
6. Reduce teacher failure and turnover.
7. Aid in teacher recruitment and selection as a situational test.
8. Orient beginning teachers.
9. Provide guided inservice experiences for teachers experiencing difficulty.
10. Permit classroom teachers to analyze their own classroom behavior.
11. Substitute for student teaching or internship settings when they are not available.
12. Stimulate research regarding teaching problem-solving behavior or the prediction of teaching behavior from behavior in a simulated setting.

Cunningham summarized the state-of-the-art of simulation, stating:

> *My personal view of simulation is that it is the most promising single innovation . . . that we have available today. Much, indeed most, of its potential remains to be activated; we have only begun to invent appropriate means for its usage.*[12]

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[10] A complete list of the thirty-one problems is found in Appendix A.

[11] Cruickshank, Donald R., and Broadbent, Frank W. "An Investigation to Determine Effects of Simulation Training on Student Teaching Behavior," p. 12 (In press).

[12] Cunningham, Luvern L., "Simulation and the Preparation of Educational Administrators," a paper presented at the UCEA International Intervisitation Conference, University of Michigan, October 1966, p. 27.

Simulation is surrounded by significant and as yet unanswered questions. All too often, face validity is considered sufficient (as with student teaching). Simulation systems need careful evaluation to determine whether or not they should be employed (do they result in greater measurable growth than employing traditional learning devices?) and where they should be employed (should simulation training be an entering experience, pre-student teaching, pre-first year teaching, or other?). Hopefully, researchers and practitioners and program developers will work together to provide answers to these essential questions.

Another line of inquiry to be pursued is, how well do learners transfer what they have learned during simulation training to real classroom teaching? Answers to this question will enable the profession to determine whether or not behavior revealed during simulation can be used as a predictor. Evidence of this nature could be extremely important for purposes of individualizing instruction, retention and promotion, and teacher recruitment and selection.

Developers of new simulation models should also strive to provide normative data regarding probable pupil reaction to a variety of teacher behaviors expressed under a variety of classroom conditions. Determination of such probabilities would enable simulation models to program consequences for a variety of teacher behaviors and to make simulation training highly individualized.

It seems clear that simulation materials should take their place alongside the many other means that college teachers, school principals, and supervisors use to present the real world of teaching to both preservice and inservice teachers. There can be no serious opposition to the concept of simulation: the real issue is whether or not such experiences may be used effectively to shift the behavior of the user and thereby improve teaching.

Appendix A

List of Critical Teaching Problems and Methods of Presentation*

1. Handling the constantly disrupting child (film).
2. Getting students to do homework (written, role play may be used incidentally).
3. Not knowing how to evaluate teaching objectives (written).
4. Handling children's aggressive behavior toward one another (film).
5. Finding films and filmstrips related to the area being studied (written).
6. Finding appropriate reading materials for readers one or more years below grade level (written).
7. Differentiating instruction among the slow, average, and gifted children in class (written role play may be used incidentally).
8. Students not motivated to work on class assignments (film).
9. Having a distaste for grading papers (written).
10. Not knowing what to do with students who finish work early (film).
11. Having students see relationship between undesirable behavior and its consequences (written).
12. Involving many of the children in group discussions (film).
13. Discussing with parents their children's unsatisfactory achievement (written incident and role play).
14. Relating a complex subject meaningfully to children (written).
15. Unhappy with classroom clerical work (film).
16. Integrating the isolated disliked child (written).
17. Having trouble interpreting children's true capabilities to parents (written incident and role play).
18. Having children do independent work quietly (film).
19. Telling parents that their children have serious problems (written incident and role play).
20. Providing appropriate work for the class while at the same time working with a small group or individual child (film).
21. Helping a student with a destructive home situation (written, role play may be used incidentally).
22. Needing help in selecting instructional materials (written).
23. Involving pupils in self-evaluation (written).
24. Being impatient with my students (film).
25. Not knowing how to deal with a child's reading problem (film).
26. Lacking enthusiasm for a subject (written).
27. Getting parents to take an interest in their children's school and classwork (written).
28. Feeling uncomfortable about giving failing grades (written and role play).
29. Feeling nervous when supervised (written).
30. Being able to prepare valid classroom tests (written).
31. Being unable to contact a parent (written).

* Identified in Cooperative Research Project 5-0798, Donald R. Cruickshank and Frank W. Broadbent, *The Simulation and Analysis of Problems of Beginning Teachers.* University of Tennessee and State University College at Brockport, New York (In Press).

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The Model in Use (Simulation)

In an effort to bring the job of the elementary school teacher into proper focus, several members of the Department of Elementary Education at Florida State University have recently initiated the use of the Teaching Problems Laboratory.[1] The Laboratory provides simulated experiences for elementary majors in the major work areas of an elementary school teacher involved with a class of 31 fifth graders. Simulated experiences are provided through the use of films, filmstrips, phonograph records, cumulative record folders, written teaching problems, and role playing cards.

Laboratory participants are given numerous opportunities to become acquainted with their class and to tackle problems that occur while they are working with these children. They teach daily lessons, plan curriculum, conduct parent conferences, study children, and gather teaching materials.

Various parts of the Laboratory are used with several classes, but during one recent quarter the entire program was used with one class. The problems discussed in this article refer to the implementation of simulated teaching as experienced in the use of the Laboratory with this class. However, it is highly possible that the same problems would exist in the implementation of other simulated teaching programs—they involved these major questions:

1. How much of an introduction should be made prior to the beginning of a simulated teaching incident?
2. How does one provide for maximum interaction of participants in simulated teaching?
3. How can the simulation director prevent students from making irrational, opinionated analyses about teaching incidents?
4. What kinds of follow-up activities should be provided for simulated teaching situations?
5. In what way can the simulation director distinguish between the most effective simulation activities and those that are merely of greatest interest to the participants?
6. What problem must be faced regarding the selection of materials in simulated teaching programs?
7. How can record-keeping in simulated instruction be constructive and not be viewed by the participants as busy work?
8. What is the best way of making final evaluation of the students' progress in a course where simulated teaching is the basic teaching strategy?

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1. It is neither practical nor desirable to expect students enrolled in any class to have had

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[1] The Teaching Problems Laboratory was developed by Donald R. Cruickshank of the University of Tennessee and Frank W. Broadbent and Roy L. Bubb of the State University College at Brockport, New York. It is published by Science Research Associates, Inc.

identical experience and training; but in classes where simulation is the primary teaching strategy, enrollment should be controlled for the purpose of avoiding extreme variations in the background of the participants. This became evident in difficulties that developed in relationship to the introduction of the simulated incidents. Here, the greatest concern was the question of whether or not the teaching incidents should be discussed prior to the simulation experience. An improper introduction might minimize the effectiveness of the simulated elementary school classroom environment, or too much of an introduction before the simulation of a teaching situation could block areas that should be explored by the participants.

Certain simulated teaching incidents projected concepts less familiar to some participants than to others. An example of this occurred with evaluation of a social studies unit. Some of the unit objectives were written in behavioral terms, and their identification was crucial to the evaluation of the unit. Since a few students were not familiar with behavioral objectives, it was debatable whether or not they should be discussed before the session on evaluating unit outcomes. The same question was raised when sociograms were first used to learn more about a child who was introduced in a film. It was obvious that participants familiar with sociograms would make better use of them and that the other students in the program would need some work in this area. Providing additional background experience for participants in the program was partially solved by pointing out resource materials on the topic in question. Some participants were able to develop additional background on the topic by independent reading.

Another consideration involving introductions to simulated incidents was the likelihood of a problem which might occur unexpectedly in a teacher's daily work. As teachers work with children, unanticipated problems often occur, and teacher trainees can profit from simulated situations which demonstrate the unexpected. It was important not to upset experiences of this kind in the simulated activity.

The problem of introducing the simulated teaching episodes in the program was resolved by a decision to handle each on an individual basis. As each simulated episode was scheduled if it appeared that any introduction whatsoever would decrease the effectiveness of the simulation experience, no introduction was given.

2. Role playing situations in the Teaching Problems Laboratory are well designed, but some participants were reluctant to assume the roles. In order to provide effective interaction in role playing, it was necessary to stress continually that the students were not on exhibit—they were not to be evaluated on how well they played a part. Rather, the role playing episodes were designed to help prospective teachers identify and solve problems similar to those they could expect as beginning teachers. More effective interaction was also reached through careful grouping of the participants in role playing situations. When it was recognized that certain students did not interact as freely as they should with some students, an attempt was made to find more effective grouping patterns.

3. When the program was first begun, some students attempted to reach decisions before they made a thorough analysis of the simulated activity. All pertinent information was not applied to solving the problems when they were identified. In some cases, the participants would offer solutions to the immediate problem and would not consider the causes of the problem.

To stimulate more thorough analyses, it was necessary to refrain from "yes" and "no" comments when discussing solutions proposed by the students. Instead, an attempt was made to focus on other circumstances that might have a bearing on the problem. As the participants became more experienced in simulation, their analyses became more thorough and reflected more rational thinking.

4. It was sometimes apparent that many of the participants needed a better understanding of basic principles discovered during a simulated experience. Since some students did not need additional study, it was necessary to differentiate follow-up assignments to help each participant increase his understanding of the teaching problem. This was done by identifying, after each simulated incident, some of the professional materials on the various topics. As much as possible, both theoretical and practical reading materials were identified. Students were then encouraged to discuss these readings in class.

In the follow-up phase of a simulated teaching episode, one problem which had to be faced was the handling of a child who constantly disrupted other children in the classroom. After viewing a film which presented this situation, participants were to suggest solutions to the problem. Listening to some of the suggestions of participants working in small groups revealed that some of them needed to learn more about the immediate steps to take in correcting the disturbing child. Those participants who understood how to handle such disturbances could benefit from an investigation of the possible reasons for the problem, while other participants needed to learn how to cope with the immediate situation before moving to the examination of causes.

5. Although the participants in the simulated program showed a high interest in the entire program, some activities were favored more than others. Role playing and film viewing were usually the best-liked activities. In evaluating these techniques, it was necessary to remain alert to the objectives for each simulated incident and to measure the extent to which participants progressed toward these objectives. At times it was difficult to distinguish between extremely positive attitudes toward a certain procedure followed in simulation and the degree to which students progressed.

6. This same problem existed in the use of certain materials. It was important to differentiat between the materials that were merely liked by the students and those that really helped identify teaching problems, although these classifications were not necessarily exclusive.

7. Another problem was the recording of the incidents. In simulated teaching, record-keeping is necessary as problems are introduced, analyzed, and solved. Using materials such as an individual participant record book could become an end in itself rather than the means to an end. There was continuous stress on the importance of keeping a systematic record on each teaching incident. Participants were encouraged to compare problems and solutions that were related in order to give unity to the various simulated activities and to emphasize that written accounts were kept for the purpose of analyzing and solving teaching problems rather than for course examination.

8. Since the simulated program constituted a university class for which credit was to be given, there was a need to make an evaluation of each student's progress. Throughout the program, it had been stressed that the participants should analyze each incident and, in so doing, identify specific and basic principles that would apply to each teaching situation. The course evaluation was based on an understanding and application of these basic principles. Examinations were constructed in such a way that students had to read a teaching incident similar to those that had been simulated and then use these basic principles to interpret the related incident.

Although these problems were present in a particular simulated teaching program, the Teaching Problems Laboratory, they could conceivably exist in any simulated program. They are challenging problems, but they can be solved. If they are not handled correctly, they can prevent the effective implementation of simulation.

Simulation is an extremely valuable teaching strategy. The reality with which teaching problems are presented and student motivation to study these problems are intense when this strategy is used. Greater use of simulation in teacher education programs is long overdue.

tip

learning . . .

In the workshop setting in which they were presented by AACTE, the discussion and demonstration of interaction analysis, nonverbal communication, microteaching, and simulation were aimed at making it possible for workshop participants to be able to make a decision about the feasibility of any one or all of these approaches in their individual teacher education programs. With this goal in view, the presentation and the workshop itself were focused on an accepted model of learning developed by Asahel D. Woodruff. This rationale allowed for participant freedom and provided a context to present the utilization of media and new technology in a visible and rational manner.

The Rationale

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The old saying that experience is the best teacher is founded on an obvious fact. Regardless of a person's formal educational status, his daily behavior is largely shaped and acquired outside of classes. This includes such real and practical behavior patterns as one's sales abilities, his clinical diagnostic skills, his knowledge of a neighborhood, his competence in teaching or in managing, and so on. These are the behavior patterns that literally govern our lives, and they are acquired in the very situations in which they operate.

These people have done their learning in the natural way in which learning occurs when it is not affected by a school. Most of it was done without the use of verbal instruction. Most of it came to them in the form of natural situations instead of books. This offers us a most valuable key to the problem if we will pay attention to it. While verbal instruction, books, and other media can be very valuable aids to learning, they can also become serious barriers to it.

Learning of all kinds begins with direct personal perception of something in life. When a person is having his first significant experience with any fact or truth, it should not be a secondhand experience such as lecture, or any other form of verbal teaching. It should be a direct "seeing" of the actual referent itself. There is no possible substitute for the mental images we acquire through our senses. Once we get them, we can begin to discuss them and sort them out, but they have to be there first.

Teachers often resort to "talking to" or "telling" a class, instead of literally "showing" them the subject. For this reason, much of our teaching is relatively ineffective. It is extremely important for the teacher to understand just how a person gets his actual personal knowledge of the things in his world.

Human learning and the role of media in that process are two phenomena that become most meaningful when they are seen in relationship to a larger context.

This context may be viewed as a theater of action in which five principal components can be identified: one, a person; two, the person's environment; three, the interaction between the person and his environment, which is composed of objects and the events in which they engage; four, the consequences which result from those events and interactions; and five, the person's perception of and reaction to the consequences, particularly those that impinge directly upon him. The fifth component can be the recognition of a satisfying state of affairs for the person and perseveration along the same line of behavior (homeostasis), or the recognition of a nonsatisfying or annoying state of affairs and a change in the person (adaptation or learning). A simple model is shown in Figure 1.

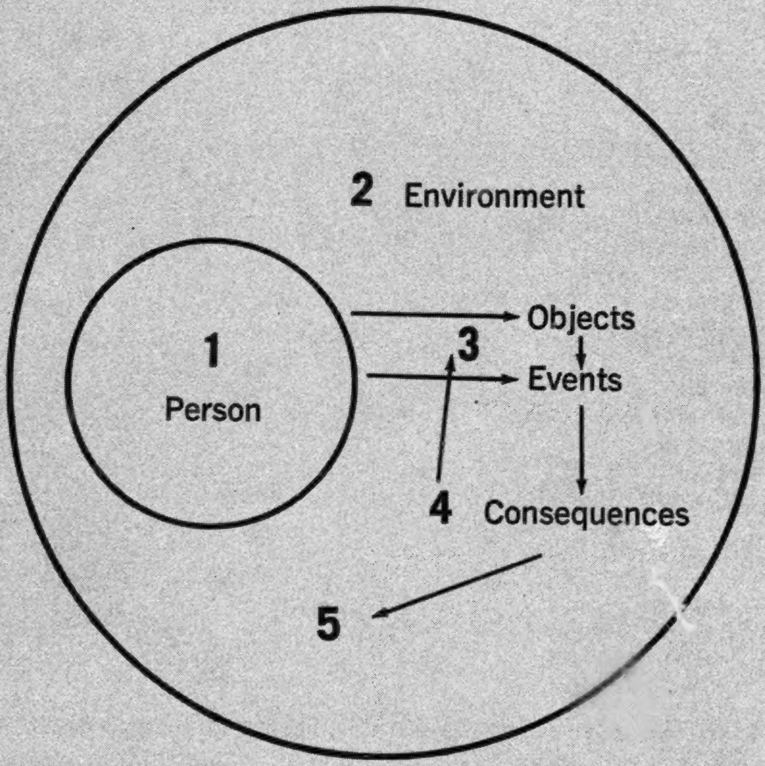

Figure I
A Person in his Theater of Behavior

The theater of action just described exists in its most potent form outside of the school; nevertheless, those five component parts are the basis of all aspects of the formal instructional program of the school.

The person is obviously the student. The environment is the subject matter. The interaction is the learning (or often the nonlearning) process, with the teaching process underlying it. The consequence is equivalent to the information contained in the subject matter. The student's perception of the significance of that information, if indeed he does perceive it, is equivalent to the perception of the consequences of an event. If and when the consequence is such that it results in an adaptive change in the person, it is the physical embodiment of an objective. This begins with some form of personal contact with actual objects, events, or circumstances in life. Contacts occur through the sensory organs, and the process by which the senses transmit meaning to the brain is known as perception. From these constantly occurring acts of perception we formulate our concepts which give us our understanding of life.

Media are the sense-perceivable forms of the environment with which the person interacts, or representations of those forms sufficiently real to produce the same sense-perception by the person that the real environment would produce were it present. Unfortunately, this parallel is more potential than real in the schools. The second, third, fourth, and fifth components are frequently so artificial or so abstract that they do not carry over into the out-of-school behavior of the student. Their replication in the school fails to the extent that verbal materials are used in the school in place of appropriate media.

The problem in education is to achieve an equivalent level and perception of reality in place of the stifling overwash of verbalism that crowds it out and reduces learning to the storing and repeating of verbal information. The need is to reproduce in the schools the potent conditions that produce learning outside of school and to see how media participate in maintaining those conditions.

Learning has often been defined as the process by which behavior is changed. Learning has also been recognized as something which happens only when the person is active. That is, behavior changes only when it is going on. Therefore, experience is recognized as the vehicle for learning. There is nothing mysterious about learning. It is not actually a separate form of behavior or a process in and of itself. It is not something the person does. All we can mean when we say a person has learned is that while he was doing something, while he was behaving in one of the regular forms of behavior, he changed. The change is found in an alteration in the way he behaves.

That is, a given pattern of response which has become more or less stabilized in a person may be changed as a result of the consequences that follow its performance. Such changes occur only as a direct result of a response instance, never in the absence of the response. Moreover, only the specific response that occurs is altered, and the alteration is always intimately tied to the consequences that follow the instance. This is as true of the higher and more complicated forms of behavior (thinking and so on) as of the simpler responses to stimuli.

In a literal sense there is no such thing as learning per se. There is only behaving. The concept of learning is an abstraction, an imaginative construct to enable us to talk about the fact that behavior often changes as it goes on. Our task is, therefore, one of describing human behavioral responses to the stimulation that comes from environment.

The simplest and most accurate way to describe the central element of behavior is in terms of the biological concept of a man-environment interaction; Figure 1 is a good portrayal of that concept. An organism engages as long as it lives in a running game with its environment, with the organism trying to shape the environment as it would like it to be and the environment trying to shape the organism so it fits better. If the organism wins, then a change occurs in some element of the environment and the organism maintains its structure. For example, a bird catches a worm and eats it. The bird merely satisfies a need through a *homeostatic* operation, which brings it back to the state of affairs which existed before the need arose and a stimulus triggered a response. If the environment wins, then a change occurs in the organism. For example, the bird fails to catch the worm and has to alter its response until it succeeds. This is an *adaptive* operation in which the bird achieves its satisfaction only at the expense of a behavioral change. Adaptation occurs through several mechanisms and such forms as genotypic changes, phenotypic changes, social changes, and psychic changes. Psychic changes, with special reference to behavior patterns, are of concern here.

Regardless of the form involved, there are certain constant conditions that are essential for change in behavior or, in this case, for learning. They are as follows:

1. A person is engaged in a real piece of want-serving behavior.
2. The behavior occurs in a real environmental setting and involves a direct man-environment interaction.
3. The response inescapably results in consequences which are in some way relevant to the want which gave rise to the response.
4. The man perceives the consequences and what he perceives, whether accurately or inaccurately, is lodged within him in a way that modifies the internal variables that govern his behavior.

To comprehend these conditions, it is helpful to visualize two cybernetic loops in each interaction, one between the man and the environment and one within the man. The cycle between the man and the environment includes a *stimulus* from the environment, which is screened through the person's antecedent psychological states; an *identifying and choosing response* leading to an *overt operation* of some kind on the environment in an attempt to alter it or use it in some way; the *consequence* of the attempt, which takes the form of an alteration in the environment; and the person's perception of the consequence, which may also function as the stimulus for another response.

The other cycle within the man includes the *perception* of a stimulus situation; the intake of what is perceived and its storage in the brain; the ensuing *selection* of a response to the stimulus situation; the *execution* of the response; the impact of the response on the environment; the person's *perception of his own* response and of the consequences; and the impact of what is perceived on the person's mediating variables.

Obviously, the two loops overlap extensively; the first emphasizes the person's impact on the environment, and the second emphasizes the environment's impact on the person.

As a consequence of the perceived consequences, the person's existing psychological states may be altered, so that subsequent responses are different. This is the basic mechanism of learning, whether it be in or out of school—the heart of it is the man-environment interaction. The interaction exists only when an intimate and direct communication occurs between the person and the environment. When that direct contact is broken, learning is prevented. It is apparent that media serve in the critical function of linking the man and his environment. Thus, media (in real or simulated form) are essential to any form of behavior and, consequently, to learning also.

An intake requirement is clearly indicated in a person's traffic with his environment, and it is that the environment "get inside" the person, so to speak. There must be perception or, in other words, the registering of meaningful sensory impressions, which the person can then turn into conceptual understandings of his world. His conceptual understandings, or concepts, are then capable of serving as his repertoire of possible responses to the environment. They enable him to identify what he faces at any given moment, to predict the possible outcomes of various responses that are open to him, and to elect a response which appears to lead to consequences which will be most satisfying to him in that situation.

The distinction between perception and conception can be made by a relatively uncomplicated differentiation, as follows. Perception is the direct sensory reception of *real phenomena* that are external to the nervous system and *actually present* at the moment. The term percept is commonly used to refer to the mental record of a single, directly sensed, concrete, specific object or event. A single percept can be a very limited, briefly caught recording of some external referent such as a pencil lying on a table. This single phenomenon constitutes one *object,* and it is so recorded. Or it can be a fairly extensive recording of an event that may have continued over a period of time such as a car approaching a house, turning in the driveway, and entering the garage. This specific phenomenon constitutes one *event,* and it is recorded and can be recalled as a complete event.

The term percept should not be limited to one "bit" of meaningful sensory input such as a flash of yellowness, or straightness, or smoothness. It may include these, but it is more helpful to let it stand for a range of phenomena from such "bits" up to one *complete referent* which is perceived. It is confusing to refer to an event which is that extensive as a concept, on the assumption that it is made up of a long series of perceptual "bits"—the term "concept" or an equivalent term has to serve a larger aspect of thinking.

Conception is the recall of stored percepts and their assembly into *patterns* conceived *by the individual* in his effort to comprehend what he has perceived. Recall may be activated by any stimulus element that was observed in the perceptual experience or by any word or sign the individual has associated with the stored percept. Thus verbal communication can stimulate recall and thinking about percepts already stored in the brain, but it cannot provide perceptual input.

From what has been described, it follows that a logistic function must take place every time a perception occurs. The environment must "speak" to the person, and the person must "understand" what the environment is saying to him—this is basically a nonverbal process. The communication is channeled through the person's many sensory organs and the afferent nerves that connect them with the brain. This environment-to-person communication process is the domain of media. It is therefore logical to speak of media as a "sensory language" through which the environment speaks to the person. The "language" consists of the properties of referents such as dimensions, color, substance, odor, appearance, motion, and so on.

This intimate sensory input is the crucial link between the person and his world. It functions critically in two phases of the man-environment interaction. One is the long and *continuing* task of "taking in" the environment, of getting to know it, mastering it conceptually. The other is the continually *recurring* task of identifying anew each of those stimulus situations which require some kind of adjustive response from the person.

There is a superficial similarity between perception and the verbal communication process which can and often does lead to trouble for students. It arises from the fact that we use our eyes to read words and our ears to hear words. This is frequently mistaken for perception, since both the eyes and ears function prominently in the perceptual process.

The contrast between sensory intake and verbal communication may be made visible by noting their functional natures. Sensory intake or perception consists of a sense organ acting on an *actual object* or *event* in the environment, resulting in the sensory recognition of an "image" (visual, auditory, olfactory, etc.) of some kind and putting some kind of registration of that image into the storage system. Words are virtually powerless to do this.

In contrast, verbal communication occurs when a verbal symbol, written or spoken and in the *absence* of an actual object or event in the environment, succeeds in provoking *recall* of one or more past sensory contacts. This is *not* the same as the original input process. It can occur only after the input process has occurred, and it is a *playback* process. These are *noninterchangeable* processes. Each is necessary for its own contribution: the sensory process to provide the content to the brain and the verbal or symbolic process to stimulate its recall and its organization into forms enabling the person to cope with his environment.

When this division of roles is violated in school by using verbal communication as a substitute for perception, students are forced into memorization of the *verbal* material communicated to them in place of perception and concept formation of the *referents* of those verbal materials. Media are the tools of perception.

Media are most significant with reference to images, portrayals, and perception. Language is most significant with reference to symbols or signs, description, recall, and interpretation.

Signs or symbols stand for images—they are not the images themselves. Description is a verbal allusion to what has been portrayed—it is not a portrayal itself. Recall and repetition are a verbal report of what has been perceived—they are not the same as perception itself. Consequently, language in any of its forms is a secondary level of response to what has been perceived through the senses by means of media. This is a critical distinction between two complementary but distinctly different and noninterchangeable processes of learning—perception and concept formation.

It is the failure to observe this distinction that has forced students to the memorization of symbolic material without adequate conceptual understanding of the referents or the actual phenomena to which those verbal materials refer. Emphasis on this distinction does not imply that all instruction at all levels has to begin with actual sense perception; but it does mean that verbal instructional processes will not be effective in developing understanding unless the students bring with them the sensory inputs from previous perceptual experiences.

It is possible, of course, to use the physical forms of media to project or otherwise convey verbal content to students, but this is a misuse of the media and is only a mechanical substitute for the use of the voice or a book. It does not result in perception by students. Media are useful primarily to *portray,* not to tell. To portray means literally "to make a picture or portrait of, to depict, to delineate, to describe *graphically,* to picture on the stage." This is to make the environment *sensorily* available to the learner.

To describe means literally "to tell or write about; give a detailed account of, to picture in *words.*" This does *not* make the environment sensorily available to the learner. It is at best a way to stimulate him to recall percepts, if he has them, and to think about them.

The sensory language mode is needed when we wish to speak to the *perceptual* senses, and this mode requires the use of images, portrayal, and sense-perceivable phenomena. We need the symbolic language mode when we wish to evoke oral communication of concepts in the *memory* or *storage* areas or to evoke recall of stored percepts and guide the learner as he organizes them into concepts. Media serve best to portray objects and events for perception. They are not used at their best for transmitting words as a substitute for the use of the vocal chords.

Turning now from the out-of-school pattern of behavior and change, we face the task of replicating in the school the essential conditions for behavioral change that are so widely present out of school. The teaching process, if it is to be effective in changing behavior, will be a deliberate staging of a man-environment interaction, engineered to result in selected changes in the behavior of the student. The requirements are approximately as follows.

The teacher sets up the interaction theater. The stage setting consists of real components of the environment relevant to the target behavior. Those components are provided by means of a variety of media. The student and the media then become the parties in the critical interaction. The teacher stays out of the interaction but directs it so that it achieves its intended purpose.

As long as the student's attention is on a meaningful task and on the environmental components involved in that task, we have an effective man-environment interaction. If the teacher distracts the student from those real or mediated components, the man-environment interaction is broken. The contact can be maintained if the teacher uses verbal communication primarily to *direct the student's attention* to his task, to the materials of the task, and to his own responses to the task.

When verbal instruction is restricted to guiding attention as distinguished from attempting to substitute for perception, it can be educative at all phases of the learning cycle. As the student is perceiving real referents or mediated referents, the teacher needs to direct the student's attention toward those aspects of the referent he should be perceiving. Then, as the student begins to try to interpret what he has just seen, the teacher's verbal behavior should stimulate him to find possible interpretations. Again, as the student makes decisions and as he carries out his adjustive acts, the teacher should stimulate him to recall whatever is relevant.

Such attention guiding is also important at the feedback stage. A student should be helped to interpret the feedback so that it results in constructive conceptual change and does not result in misintepretation or in damage to the student's self-concept. In this way, verbal stimulation is *not* something that is imposed on the student's cognitive cycle—it facilitates the student's own processes rather than attempting to substitute for them. The student, under the teacher's stimulation is doing his own perception, thinking, decision-making, and trying.

The contact between the student and his environment is broken when the teacher uses language or even nonverbal communication channels in a way that draws the student's attention from the task-setting to the teacher. This is the case when the teacher becomes a dispenser of verbal information or tries in any way to substitute his own descriptive activities for the real or mediated components of an environmental task-setting. To summarize, teaching is *not* telling. It is setting an interaction stage and directing—it is creating environment with media.

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Index to Volume VII

Articles

Allen, Dwight W., and Eve, Arthur S. Microteaching, 181–85.
Alexander, William M. The Middle School Movement, 114–17.
Amidon, Edmund J. Interaction Analysis, 159–67.
Anonymous. Pressures That Drove Me to a Psychiatrist's Couch, 1-3.
Anonymous. What Is Myself?, 43–45.
Atkins, Neil P. Rethinking Education in the Middle, 118–19.
The Beatnik: Up—, Down—, and Off—. Jules H. Masserman, 38-42.
Berry, Stephen D., and Miller, Charles I. Where Do We Go From Here?, 149–51.
Brandes, Norman S. The Significance of Emotional Disorder in the Teacher, 6-9.
Cass, James. Politics and Education in the Sunshine State—The Florida Story, 89-95.
Change in the Developing World. Jack Frankel, 136-37.
Collective Negotiations and the Principalship. Luvern L. Cunningham, 62–70.
Compton, Mary F. The Middle School: Alternative to the Status Quo, 108–110.
Corwin, Ronald G. Teacher Militancy in the United States: Reflections on Its Sources and Prospects, 96–102.
Crisis on the Campus. Ralph E. Van Atta, 34–37.
Cruickshank, Donald R. Simulation, 190-93.
Cunningham, Luvern L. Collective Negotiations and the Principalship, 62–70.
Dahl, Richard K., and Russell, Robert M. Moral Pressures on College Students, 30–33.
Eichhorn, Donald H. Middle School Organization: a New Dimension, 111–13.
Eve, Arthur S., and Allen, Dwight W. Microteaching, 181–85.
Faculty Power in the Community College. Richard J. Frankie and Ray A. Howe, 83–88.
Frankel, Jack. Change in the Developing World, 136–37.
Frankie, Richard J., and Howe, Ray A. Faculty Power in the Community College, 83–88.
Frymier, Jack R. Teacher Power, Negotiations, and the Roads Ahead—An Editorial, 103–104.
Frymier, Jack R. The Need for an Optimal View of Pressures, 4–5.
Frymier, Jack R. This Issue, 49–50.
Galloway, Charles M. Nonverbal Communication, 172–75.
Gittell, Marilyn. Teacher Power and Its Implications for Urban Education, 80–82.
Havighurst, Robert J. The Middle School Child in Contemporary Society, 120–22.
Heinich, Robert. Mediated Instruction: an Alternative to Classroom Instruction, 146–48.
Horvat, John J. The Nature of Teacher Power and Teacher Attitudes Toward Certain Aspects of This Power, 51–56.
Howe, Ray A., and Frankie, Richard J. Faculty Power in the Community College, 83–88.
Howell, Wayne K. Technology and the Human Need, 152–55.
Howell, Wayne K. This Issue, 134–35.
Interaction Analysis. Edmund J. Amidon, 159–67.
Johnson, Ted, and Otero, Hector. The School and Technology, 138–41.
Lail, Sue S. The Model in Use (Nonverbal Communication), 176–80.
Leles, Sam. Teacher Power—What's It All About?. 57–61.
Like It Is—Pressures in a Ghetto School. Grace Van Atta, 17–22.
Link, Frances R. Pressures on Youth: Suburbia, 23–25.
Mars, Walter J. This Issue, 157–58.
Masserman, Jules H. The Beatnik: Up—, Down—, and Off—, 38–42.
Mediated Instruction: an Alternative to Classroom Instruction. Robert Heinich, 146–48.
Meeting of the Minds. G. Murlin Welch, 26–29.
Microteaching. Dwight W. Allen and Arthur S. Eve, 181–85.
The Middle School: Alternative to the Status Quo. Mary F. Compton, 108–110.
The Middle School Child in Contemporary Society. Robert J. Havighurst, 120–22.
The Middle School Movement. William M. Alexander, 114–17.
Middle School Organization: a New Dimension. Donald H. Eichhorn, 111–13.
Miller, Charles I., and Berry, Stephen D. Where Do We Go From Here?, 149–51.
Minnis, Douglas L., and Shrable, Kenneth. The Model in Use (Interaction Analysis), 168–71.
The Model in Use (Interaction Analysis). Douglas L. Minnis and Kenneth Shrable, 168–71.
The Model in Use (Microteaching). David B. Young and Dorothy A. Young, 186–89.
The Model in Use (Nonverbal Communication). Sue S. Lail, 176–80.
The Model in Use (Simulation). Glennon Rowell, 194–96.
Moral Pressures on College Students. Richard K. Dahl and Robert M. Russell, 30–33.
The Nature of Teacher Power and Teacher Attitudes Toward Certain Aspects of This Power. John J. Horvat, 51–56.
The Need for an Optimal View of Pressures. Jack R. Frymier, 4–5.
Nonverbal Communication. Charles M. Galloway, 172–75.
Otero, Hector, and Johnson, Ted. The School and Technology, 138–41.
Politics and Education in the Sunshine State—The Florida Story. James Cass, 89–95.
Pressures on Young Children. Bernard Spodek, 14–16.
Pressures on Youth: Suburbia. Frances R. Link, 23–25.
Pressures That Drove Me to a Psychiatrist's Couch. Anonymous, 1–3.
Radvak, Betty Jean. The Teacher and Technology, 142–45.
The Rationale. Asahel D. Woodruff, 197–202.
Reese, Frederick R. School Age Suicide and the Educational Environment, 10–13.
Rethinking Education in the Middle. Neil P. Atkins, 118–19.
Rowell, Glennon. The Model in Use (Simulation), 194–96.
Russell, Robert M., and Dahl, Richard K. Moral Pressures on College Students, 30–33.
School Age Suicide and the Educational Environment. Frederick R. Reese, 10–13.
The School and Technology. Ted Johnson and Hector Otero, 138–41.
Shafer, Harold T. Teacher Power and the Middleman in Education, 71–75.

Shrable, Kenneth and Minnis, Douglas L. The Model in Use (Interaction Analysis), 168–71.
The Significance of Emotional Disorder in the Teacher. Norman S. Brandes, 6–9.
Simulation. Donald R. Cruickshank, 190–93.
Southworth, Horton C. Teacher Education for the Middle School: A Framework, 123–28.
Spodek, Bernard. Pressures on Young Children, 14–16.
The Teacher and Technology. Betty Jean Radvak, 142–45.
Teacher Education for the Middle School: a Framework. Horton C. Southworth, 123–28.
Teacher Militancy in the United States: Reflections on Its Sources and Prospects. Ronald G. Corwin, 96–102.
Teacher Power and Its Implications for Urban Education. Marilyn Gittell, 80–82.
Teacher Power and the Middleman in Education. Harold T. Shafer, 71–75.
Teacher Power as Viewed by the School Board and the Superintendent. C. Taylor Whittier, 76–79.
Teacher Power, Negotiations, and the Roads Ahead —An Editorial. Jack R. Frymier, 103–104.
Teacher Power—What's It All About? Sam Leles, 57–61.
Techonology and the Human Need. Wayne K. Howell, 152–55.
This Issue, Walter J. Mars, 157–58.
This Issue, Emmett L. Williams, 105–107.
This Issue, Jack R. Frymier, 49–50.
This Issue, Wayne K. Howell, 134–35.
Van Atta, Grace. Like It Is—Pressures in a Ghetto School, 17–22.
Van Atta, Ralph E. Crisis on the Campus, 34–37.
Welch, G. Murlin. Meeting of the Minds, 26–29.
What Is Myself?. Anonymous, 43–45.
Where Do We Go From Here?. Stephen D. Berry and Charles I. Miller, 149–51.
Whittier, C. Taylor. Teacher Power as Viewed by the School Board and the Superintendent, 76–79.
Williams, Emmett L. This Issue, 105–107.
Woodruff, Asahel D. The Rationale, 197–202.
Young, David B., and Young, Dorothy A. The Model in Use (Microteaching), 186–89.
Young, Dorothy A., and Young, David B. The Model in Use (Microteaching), 186–89.

Book Reviews

Alexander, William M.; Williams, Emmett L.; Compton, Mary; Hines, Vynce A.; and Prescott, Dan. *The Emergent Middle School.* Reviewed by Alexander M. Gottesman, 129–30.
The American Middle School; An Organizational Analysis. Samuel H. Popper. Reviewed by Alexander M. Gottesman, 131.
Association for Childhood Education International. *The Transitional Years—The Middle School Portfolio.* Reviewed by Alexander M. Gottesman, 131.
Children Under Pressure. Ronald C. Doll and Robert S. Fleming, editors. Reviewed by James E. Kerber, 47–48.
Compton, Mary; Alexander, William M.; Williams, Emmett L.; Hines, Vynce A.; and Prescott, Dan. *The Emergent Middle School.* Reviewed by Alexander M. Gottesman, 129–30.
The Conspiracy Against Childhood. Eda J. LeShan. Reviewed by Charles M. Galloway, 46.
Doll, Ronald C., and Fleming, Robert S., editors. *Children Under Pressure.* Reviewed by James E. Kerber, 47–48.
Eichhorn, Donald H. *The Middle School.* Reviewed by Alexander M. Gottesman, 130.
The Emergent Middle School. William M. Alexander; Emmett L. Williams; Mary Compton; Vynce A. Hines; and Dan Prescott. Reviewed by Alexander M. Gottesman, 129–30.
Fleming, Robert S., and Doll, Ronald C., editors. *Children Under Pressure.* Reviewed by James E. Kerber, 47–48.
Galloway, Charles M., reviewer. *The Conspiracy Against Childhood,* Eda J. LeShan, 46.
Gottesman, Alexander M., reviewer. *The American Middle School; An Organizational Analysis,* Samuel H. Popper, 131.
Gottesman, Alexander M., reviewer. *The Emergent Middle School,* William M. Alexander; Emmett L. Williams; Mary Compton; Vynce A. Hines; and Dan Prescott, 129–30.
Gottesman, Alexander M., reviewer. *The Middle School,* Donald H. Eichhorn, 130.
Gottesman, Alexander M., reviewer. *Perspectives on The Middle School,* Ann M. Grooms, 130.
Gottesman, Alexander M., reviewer. *Teaching in Middle Schools,* Alvin W. Howard, 131.
Gottesman, Alexander M., reviewer. *The Transitional Years—The Middle School Portfolio,* Association for Childhood Education International, 131.
Grooms, Ann M. *Perspectives on The Middle School.* Reviewed by Alexander M. Gottesman, 130.
Hines, Vynce A.; Alexander, William M.; Williams, Emmett L.; Compton, Mary; and Prescott, Dan. *The Emergent Middle School.* Reviewed by Alexander M. Gottesman, 129–30.
Howard, Alvin W. *Teaching in Middle Schools.* Reviewed by Alexander M. Gottesman, 131.
Kerber, James E., reviewer. *Children Under Pressure,* Ronald C. Doll and Robert S. Fleming, editors, 47–48.
LeShan, Eda J. *The Conspiracy Against Childhood.* Reviewed by Charles M. Galloway, 46.
The Middle School. Donald H. Eichhorn. Reviewed by Alexander M. Gottesman, 130.
Perspectives on The Middle School. Ann M. Grooms. Reviewed by Alexander M. Gottesman, 130.
Popper, Samuel H. *The American Middle School; An Organizational Analysis.* Reviewed by Alexander M. Gottesman, 131.
Prescott, Dan; Alexander, William M.; Williams, Emmett L.; Compton, Mary; and Hines, Vynce A. *The Emergent Middle School.* Reviewed by Alexander M. Gottesman, 129–30.
Teaching in Middle Schools. Alvin W. Howard. Reviewed by Alexander M. Gottesman, 131.
The Transitional Years— The Middle School Portfolio. Association for Childhood Education International. Reviewed by Alexander M. Gottesman, 131.
Williams, Emmett L.; Alexander, William M.; Compton, Mary; Hines, Vynce A.; and Prescott, Dan. *The Emergent Middle School.* Reviewed by Alexander M. Gottesman, 129–30.

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Insights

In the next issue, **Theory Into Practice** departs from its thematic approach to present "Insights," an issue on education in general. This issue includes articles on change, educational leadership, school organization, Bruner, discovery modes, the contemporary community, and learning and life.

Authors contributing to the issue are Andrew Halpin, University of Georgia; Harvey Goldman, The University of Wisconsin, Milwaukee; Douglas R. Pierce, University of California, Berkeley; Gordon D. Lawrence, George Peabody College for Teachers; Greta Morine, California State College, Hayward; Donald Bourgeois, Governor's Office of Human Resources, Illinois; and Jack R. Frymier, The Ohio State University.

Each year TIP receives many excellent manuscripts that must be reluctantly returned to authors only because they do not fit the themes of issues that are planned. The issue on "Insights" is our solution to this dilemma—most of the articles in it were selected from among the most thoughtful and provocative unsolicited manuscripts we have received in recent months. All are of general interest and importance in education.